



ADDENDUM TO

SEMI-ANNUAL MONITORING REPORT

JULY - DECEMBER 2016

for the

**Delaware Sand & Gravel Superfund Site
New Castle, Delaware**

Submitted To: United States Environmental Protection Agency
Region III
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ACRONYMS AND ABBREVIATIONS

ACL	Army Creek Landfill
AWC	Artesian Water Company
CLP	Contract Laboratory Program
DDA	Drum Disposal Area
DNREC	State of Delaware Department of Natural Resources and Environmental Control
DQA	Data Quality Assessment
DS&G	Delaware Sand & Gravel
FSWP Rev 2	Feasibility Study Work Plan - Revision 2
HA	Health Advisory
HDPE	High-Density Polyethylene
LC/MS/MS	Liquid Chromatography/Tandem Mass Spectrometry
LCS	Laboratory Control Sample
LDPE	Low-Density Polyethylene
LIMS	Laboratory Information Management System
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NCC	New Castle County
NFG	National Functional Guidelines
ng/l	nanograms per liter
PFCs	Perfluorinated Compounds
PFCWP	Perfluorinated Compounds Work Plan
PF OA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
ppt	parts per trillion
QA/QC	Quality Assurance/Quality Control
SAP	Sampling and Analysis Plan
UPA	Upper Potomac Aquifer
UPCUTZ	Upper Potomac Confining Unit Transition Zone
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

On behalf of the Delaware Sand & Gravel (DS&G) Remedial Trust (the Trust), Golder Associates Inc. (Golder) is providing this Addendum to the July-December 2016 Semi-Annual Monitoring Report for the Delaware Sand & Gravel Superfund Site (the Site) located in New Castle, Delaware (see Figures 1 and 2). This addendum summarizes the collection of samples from a subset of wells (see Table 1 and Figures 3 and 4) during the September-October 2016 monitoring event for analysis of perfluorinated compounds (PFCs). The samples were collected and analyzed in accordance with the United States Environmental Protection Agency (USEPA)-approved¹ work plan for sampling and analysis of PFCs in groundwater at the Site (PFCWP) dated September 21, 2016 (Golder, 2016a), and the Feasibility Study Work Plan Revision 2 (FSWP Rev 2) Sampling and Analysis Plan (SAP) dated October 21, 2011 (Golder, 2011).

¹ The USEPA provided approval of the work plan via email dated September 23, 2016 (USEPA, 2016a).

2.0 GROUNDWATER SAMPLING AND ANALYSES

Consistent with the PFCWP (Golder, 2016a) and the FSWP Rev 2 SAP (Golder, 2011), Golder measured water levels, purged and sampled select wells (see well list in Table 1) screened in the Upper Potomac Confining Unit Transition Zone (UPCUTZ) and in the upper and/or lower sand of the Upper Potomac Aquifer (UPA) at and downgradient of the Site (see Figures 3 and 4), and submitted the samples for analysis.

The following summarizes information related to sampling and analysis of PFCs in groundwater at the Site that was not provided in the Semi-Annual Monitoring Report for July-December 2016.

2.1 Sampling and Analysis

2.1.1 Well Purging

The monitoring wells were purged following the low-flow purging and sampling procedure² using a decontaminated 2-inch diameter submersible pump (Grundfos® Rediflo2) and low-density polyethylene tubing^{3,4} (LDPE) that was dedicated to each well, with the exception of well MW-18 which was sampled using a peristaltic pump equipped with LDPE tubing^{3,4}.

2.1.2 Sample Collection and Analysis

For analysis of PFCs, Eurofins Lancaster Laboratories of Lancaster, Pennsylvania (Eurofins) supplied certified-clean sample bottles, blank bottle labels, custody seals, analyte-free water, coolers, and chain-of-custody documents for the monitoring event. All samples were collected directly into the laboratory-supplied HDPE containers. Once the containers were sealed, they were placed into individual new Ziploc® storage bags, and carefully packed into standard sample coolers with ice at approximately four degrees Celsius. All samples were shipped under chain-of-custody procedures via an overnight courier to Eurofins for analysis.

In addition to the primary samples, the following quality assurance/quality control (QA/QC) samples were collected during the September-October 2016 monitoring event for PFC analysis:

- Eleven trip blanks (one per day of sample collection)
- Eleven field blanks (one per day of sample collection)
- Four field equipment rinsate blanks from decontaminated submersible pumps (one for each pump used in the field)

² The procedure is based upon the USEPA Region II document entitled "Groundwater Sampling Procedure, Low Stress (Low Flow) Purging and Sampling" dated March 20, 1998.

³ Prior to the September-October 2016 monitoring event, Teflon®-lined polyethylene tubing was used. Use of Teflon®-lined tubing and bailers has been discontinued at the Site due to inclusion of PFCs as analytes for groundwater.

⁴ Due to concerns with use of LDPE tubing for sampling of PFCs, the LDPE tubing was swapped out for high-density polyethylene (HDPE) tubing for the April 2017 groundwater monitoring event.

- Field duplicate parameter sets from four wells (UPA-03D, AWC-E1, MW-29, and DGC-5) (one set for each set of 20 samples collected)
- Triple volumes from four wells (MW-26N, MW-31, DDA-07, and AWC-E2) for the analysis of matrix spike/matrix spike duplicates (MS/MSD) (one set for each set of 20 samples collected)

Samples were analyzed for fourteen PFCs by Eurofins using USEPA Method 537, *Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1* (September 2009).

2.2 Data Quality Assessment

Eurofins logged the samples into their laboratory information management systems (LIMS) upon receipt, and scheduled the samples for preparation and analysis. Golder performed validation on all the data following guidelines provided by USEPA Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (September 2016), as applicable to the aforementioned analytical method. Additional information regarding sample analysis and validation, including the Data Quality Assessment (DQA) are presented in Appendix A. The laboratory result forms for the validated sample data are also included in Appendix A.

Based on the data evaluations and data quality assessment, the analytical data for samples collected at the Site were determined to be acceptable (including estimated data) for their intended use. All sample results in sample data group (SDG) DSG02 were qualified as estimated (J/UJ) when, due to laboratory error, samples were extracted outside the 14-day hold time. A corrective action letter from the lab regarding the samples analyzed out of hold time is included in Appendix A. Generally acceptable levels of accuracy and precision, based on laboratory control sample (LCS), MS/MSD, field duplicate, and surrogate recoveries, were achieved for the data. In addition, the data completeness (i.e., the ratio of the amount of valid data obtained to the amount expected, including estimated data (J/J+J-/UJ)) was 100%. The data qualifier summary is presented in Table 2 of Appendix A.

PFCs were not detected in the trip, field or equipment blanks collected and analyzed during this event.

2.3 Analytical Results

The detected PFCs and their respective concentrations for the groundwater samples collected during the September-October 2016 monitoring event are summarized and compared to the May 19, 2016 USEPA health advisory (HA) of 70 nanograms per liter (ng/l; parts per trillion [ppt]) for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and/or the combined concentrations of PFOA and PFOS in Table 2.

2.3.1 Drum Disposal Area (DDA) Vicinity Wells

Golder collected groundwater samples from a total of 16 monitoring wells (2 wells screened in the UPCUTZ and 14 wells screened in the UPA) in the vicinity of the DDA for analysis of PFCs during the September-October 2016 monitoring event. PFOA was detected in UPCUTZ and UPA upper sand monitoring wells above the May 19, 2016 USEPA HA (see Table 2 for details). An isoconcentration map for PFOA in the UPA upper sand groundwater between the DDA and well PW-1(U) is included as Figure 5.

2.3.2 Wells Downgradient of the DS&G and ACL Sites

Golder collected groundwater samples from one UPCUTZ and 28 UPA monitoring wells located downgradient of the DS&G and Army Creek Landfill (ACL) Sites for analysis of PFCs during the September-October 2016 monitoring event. PFOA and PFOS were detected in downgradient UPA monitoring wells above the May 19, 2016 USEPA HA (see Table 2). PFOA concentrations in the UPA upper and lower sand downgradient of the DS&G and ACL Sites are shown on Figures 6 and 7.

3.0 RECOMMENDATION

As recommended to the USEPA via email on March 28, 2017 (DS&G, 2017) and approved by the USEPA on March 28, 2017 (USEPA, 2017), Golder will be performing a confirmatory round of PFC sampling and analysis during the April 2017 semi-annual monitoring event. The confirmatory round will include the same wells and PFC analytes as the October 2016 monitoring event. Based on the results from both the October 2016 and April 2017 PFC monitoring events, Golder will recommend a PFC monitoring program for the October 2017 monitoring event and incorporate PFC data into the conceptual site model.

4.0 CLOSING

Golder appreciates the opportunity to prepare this report for submission to the USEPA on behalf of the Trust. Should you have any questions regarding this report, please contact Ms. Theresa Miller at (603) 668-0880.

GOLDER ASSOCIATES INC.



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5.0 REFERENCES

- Golder, 2011. Feasibility Study Work Plan, Revision 2, Delaware Sand & Gravel Superfund Site, New Castle, Delaware. October 21, 2011.
- Golder, 2016a. Perfluorinated Compounds – Well Purging, Groundwater Sampling and Analysis Program, Delaware Sand & Gravel Superfund Site, New Castle, Delaware. September 21, 2016.
- DS&G, 2016. Email from Doug Sutton, on behalf of the DS&G Trust, to Debbie Rossi (USEPA) confirming quantification of both the linear and branched isomers of analytes in PFC Work Plan. September 30, 2016.
- DS&G, 2017. Email from Doug Sutton, on behalf of the DS&G Trust, to Debbie Rossi (USEPA) recommending confirmatory monitoring event for PFCs in April 2017. March 28, 2017.
- USEPA, 1995. Innovative Approaches for Validation of Organic and Inorganic Data – Standard Operating Procedures. USEPA Region III. June 30, 1995.
- USEPA, 2016a. Email from Debbie Rossi (USEPA) to Doug Sutton (DS&G Trust) providing approval of the PFC Work Plan. September 23, 2016.
- USEPA, 2016b. Email from Debbie Rossi (USEPA) to Doug Sutton (DS&G Trust) requesting quantification of both the linear and branched isomers of analytes in PFC Work Plan. September 27, 2016.
- USEPA, 2017. Email from Debbie Rossi (USEPA) to Doug Sutton agreeing to recommendation for confirmatory monitoring event for PFCs in April 2017. March 28, 2017.

TABLES

Table 1
September-October 2016 Semi-Annual Monitoring Program - PFC Monitoring
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Sample ID	PFC Monitoring	FSWP Revision 2 (October 2011) Sample Location?
Drum Disposal Area (DDA) Vicinity Monitoring Wells		
DDA-01	x	Yes
DDA-02	x	Yes
DDA-03	x	Yes
DDA-05	x	Yes
DDA-07-US	x	
DDA-10-US	x	
DDA-11-LS	x	
DDA-11-US	x	
DDA-12-US	x	
DDA-15-US	x	
DDA-16-US	x	
DDA-17	x	
DGC-2S	x	Yes
DGC-5	x	Yes
DGC-7S	x	Yes
MHW-1D	x	Yes
Wells Downgradient of the DS&G and ACL Sites		
AWC-E1 at 132 ft bgs	x	-
AWC-E1 at 156 ft bgs	x	-
AWC-E2 at 140 ft bgs	x	-
AWC-E2 at 165 ft bgs	x	-
AWC-G3R	^	Yes
AWC-K1	x	Yes
BW-1	x	-
BW-2	x	-
DGC-10D	x	Yes
DGC-10S	x	Yes
DGC-11D	x	Yes
DGC-11S	x	Yes
DGC-8D	x	-
DGC-8S	x	-
MW-18	x	Yes***
MW-26N	x	Yes***
MW-28	x	-
MW-29	x	-
MW-22N		-
MW-34	x	Yes***
P-4_UPA	x	-
P-5L	x	-
P-5U	x	-
MW-40		-
RT-1-UP	x	Yes
UPA-01	x	Yes
BW-3		-
UPA-02S	x	Yes
UPA-03D	x	Yes
UPA-101-TZ	x	
UPA-101-US	x	

Notes:

- 1) A synoptic round of water level measurements was collected after the monitoring event.
- 2) The following quality assurance/quality control (QA/QC) samples were collected during the monitoring event at a rate of 1 per 20 primary samples: field duplicates, field equipment rinsate blanks, matrix spikes and matrix spike duplicates.
- 3) Trip blanks accompanied each shipment of samples (1 per day).
- 4) FSWP = Feasibility Study Work Plan
- 5) UPA = Upper Potomac Aquifer
- 6) NCC = New Castle County
- 7) AWC = Artesian Water Company
- 8) PFC = Perfluorinated Compound
- 9) ft bgs = feet below ground surface

- Indicates well was not included as a FSWP Revision 2 sample location

*** Initially sampled in April 2012 to collect additional FS parameters, but due to detections in well P-6_(UPA), these area wells remained in the monitoring program.

^ Well was not sampled during the September-October 2016 sampling event due to denial of access by AWC

Prepared by: TGB
Checked by: BPC
Reviewed by: TAM

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Sample ID Sample Date			DDA-05 9/27/2016		DDA-01 9/27/2016		DDA-02 9/28/2016		DDA-03 9/29/2016		DDA-07-US 10/10/2016		DDA-10-US 10/5/2016		DDA-11-LS 9/27/2016		DDA-11-US 9/29/2016		DDA-12-US 9/29/2016		DDA-15-US 10/6/2016		DGC-8S 10/6/2016		DGC-8D 10/6/2016		DGC-10D 9/29/2016		DGC-10S 9/29/2016							
N=Normal, FD=Field Duplicate			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N								
Parameter	Unit	CAS	HA	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL						
Perfluorohexanoic acid	ng/l	307-24-4	NE	29	J-	1	29	1	25	1	61	1	25	1	43	J	1	25	1	27	1	60	1	21	1	31	J-	1	13	1	21	1	20	1		
Perfluoroheptanoic acid	ng/l	375-85-9	NE	13		1	22	1	22	J-	1	48	J-	1	16	1	23	J	1	20	J+	1	23	1	34	1	17	1	8	1	13	1	13	1		
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	76	J-	1	180	1	150	1	600	10	150	1	180	J	1	140	1	150	1	230	1	200	1	34	1	49	1	110	1	38	1			
Perfluorononanoic acid	ng/l	375-95-1	NE	2	J	1	10	1	12	1	12	1	9	1	7	J	1	10	J	1	13	1	13	1	5	J+	1	5	1	3	J+	1	13	1		
Perfluorodecanoic acid	ng/l	335-76-2	NE		U	1	2	J+	1	1	J	1	7	1	1	J	1	2	J+	1	3	1	2	J	1	1	J+	1	2	1	1	J+	1	12	1	
Perfluoroundecanoic acid	ng/l	2058-94-8	NE		U	2		U	2	U	2		UJ	2	U	2	UJ	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	J	2		
Perfluorododecanoic acid	ng/l	307-55-1	NE		UJ	3		U	3	U	3		UJ	3	U	3	UJ	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3		
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		UJ	2		U	2	U	2		UJ	2	U	2	UJ	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2		
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		UJ	3		U	3	U	3		UJ	3	U	3	UJ	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3		
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		UJ	4		UJ	4	6	J	4		U	4	U	4	UJ	4	UJ	4	U	4	U	4	U	4	U	4	U	4	U	4			
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE		U	4	41	4	19	4	73	4	21		4	53	J	4	14	J+	4	7	J	4	25	4	26	4	U	4	17	4	35	4	18	4
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	7	J	5	29	5	18	5	64	5	19	5	16	J+	5	14	J	5	23	5	19	5	22	5	U	5	12	5	24	5	15	5		
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		U	4		U	4	UJ	4	4	J	4	U	4	UJ	4	U	4	UJ	4	U	4	U	4	U	4	UJ	4	UJ	4	UJ	4		
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2919-50-6	NE		UJ	5		UJ	5	U	5		UJ	5	U	5	UJ	5	UJ	5	UJ	5	U	5	U	5	U	5	UJ	5	UJ	5	UJ	5		
Total PFOA + PFOS	ng/l	NA	70	83		209		168		664		169		196		154		173		249		222		34		61		134		53						

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Parameter	Unit	CAS	HA	Sample ID			DDA-16-US			DDA-17			DGC-2S			DGC-5			DGC-7S			MHW-1D			DGC-11D			DGC-11S			RT-1-UP			UPA-01			UPA-02D			UPA-02S			UPA-03D		
				Sample Date N=Normal, FD=Field Duplicate			9/27/2016	N	9/28/2016	N	9/27/2016	N	10/10/2016	FD	10/10/2016	N	10/10/2016	N	10/6/2016	N	10/3/2016	N	10/3/2016	N	10/5/2016	N	10/6/2016	N	9/29/2016	N	10/3/2016	FD													
Perfluorohexanoic acid	ng/l	307-24-4	NE	29	1	57	1	34	1	44	1	55	1	23	1	..	1	22	J	1	UJ	1	3	1	38	J-	1	27	1	44	1	45	J	1											
Perfluoroheptanoic acid	ng/l	375-85-9	NE	20	J+	1	34	J+	1	23	J+	1	29	1	31	J+	1	16	1	31	1	12	J	1	UJ	1	U	1	23	1	18	1	21	1	26	J	1								
Perfluooctanoic acid (PFOA)	ng/l	335-67-1	70	200		1	290		1	200		1	160		1	180		1	280		1	43	J+	1	UJ	1	2	1	120	1	180	1	60	1	170	J	1								
Perfluorononanoic acid	ng/l	375-95-1	NE	7	J	1	7	J+	1	9	J+	1	5	J+	1	6	J+	1	10	1	13	J+	1	13	J	1	UJ	1	U	1	6	1	9	1	2	1	8	J	1						
Perfluorodecanoic acid	ng/l	335-76-2	NE	1	J+	1	2	J+	1	U	2	U	2	U	2	U	2	U	2	U	2	U	1	UJ	1	U	1	5	1	3	1	U	1	13	J+	1									
Perfluoroundecanoic acid	ng/l	2058-94-8	NE	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	UJ	2										
Perfluorododecanoic acid	ng/l	307-55-1	NE	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	UJ	3	UJ	3	U	3	U	3	U	3	U	3	UJ	3										
Perfluorotridecanoic acid	ng/l	72629-94-8	NE	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	U	2	UJ	2	UJ	2	U	2	U	2	U	2	U	2	UJ	2										
Perfluorotetradecanoic acid	ng/l	376-06-7	NE	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	U	3	UJ	3	UJ	3	U	3	U	3	U	3	U	3	UJ	3										
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE	UJ	4	U	4	UJ	4	U	4	U	4	U	4	U	4	U	4	U	4	UJ	4	U	4	U	4	U	4	U	4	U	4	UJ	4										
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE	17	4	56	J+	4	6	J	4	7	J	4	9	J	4	14	4	4	UJ	4	U	4	52	4	34	4	5	J	4	110	J+	4											
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	17	J+	5	34	J+	5	12	J+	5	9	J	5	12	5	15	5	16	5	7	J+	5	UJ	5	U	5	29	5	21	5	U	5	50	J+	5								
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE	U	4	U	4	U	4	U	4	U	4	U	4	U	4	U	4	UJ	4	UJ	4	U	4	U	4	UJ	4	UJ	4	UJ	4												
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE	UU	5	U	5	UU	5	U	5	U	5	U	5	U	5	U	5	UJ	5	UJ	5	U	5	U	5	UJ	5	UJ	5	UJ	5												
Total PFOA + PFOS	ng/l	NA	70	217		324		212		169		202		145		296		50		0		2		149		201		60		220															

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Parameter	Unit	CAS	Sample ID			UPA-03D 10/3/2016 N			AWC-E1 10/13/2016 FD			AWC-E1 10/13/2016 N			BW-1 10/4/2016 N			BW-2 10/4/2016 N			MW-18 10/7/2016 N			MW-26N 10/3/2016 N			MW-28 10/5/2016 N			MW-29 10/5/2016 FD			MW-29 10/5/2016 N			MW-31 10/5/2016 N			MW-34 10/7/2016 N			P-4_UPA 10/14/2016 N			P-5L 10/7/2016 N				
			N=Normal, FD=Field Duplicate			Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL											
Perfluorohexanoic acid	ng/l	307-24-4	NE	51	J	1	29		1	29		1	25	J	1	20	J	1	28	J-	1	20	J	1	40		1	30	J	1	31	J	1	40	J-	1	18		1	86		1	9		1				
Perfluoroheptanoic acid	ng/l	375-85-9	NE	29	J+	1	16		1	16		1	16	J	1	13	J	1	20		1	11	J+	1	23		1	19	J	1	19	J	1	28		1	10		1	33		1	5	J+	1				
Perfluooctanoic acid (PFOA)	ng/l	335-67-1	70	180	J	1	86		1	84		1	130	J	1	83	J	1	150	J-	1	87	J	1	54		1	130	J	1	120	J	1	190	J-	1	66		1	170		1	35		1				
Perflurononanoic acid	ng/l	375-95-1	NE	8	J+	1	10		1	10		1	10	J+	1	9	J	1	6		1	4	J+	1	3		J+	1	9	J	1	9	J	1	6		1	5		1	68		1	1	J+	1			
Perfluorodecanoic acid	ng/l	335-76-2	NE	13	J+	1	2		1	3		1		UJ	1	2	J	1	2		J	1	1	J+	1			U	1	2	J	1	2	J	1	1	U	1	1	J	1		U	1					
Perfluoroundecanoic acid	ng/l	2058-94-8	NE		UJ	2		U	2		U	2		UJ	2		UJ	2		UJ	2		UJ	2		UJ	2		UJ	2		UJ	2		UJ	2		U	2		U	2							
Perfluorododecanoic acid	ng/l	307-55-1	NE		UJ	3		U	3		U	3		UJ	3		UJ	3		U	3		UJ	3		UJ	3		UJ	3		UJ	3		UJ	3		U	3		U	3							
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		UJ	2		U	2		U	2		UJ	2		UJ	2		U	2		UJ	2		UJ	2		UJ	2		UJ	2		U	2		U	2										
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		UJ	3		U	3		U	3		UJ	3		UJ	3		U	3		UJ	3		UJ	3		UJ	3		UJ	3		U	3		U	3										
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		UJ	4		U	4		U	4		UJ	4		UJ	4		U	4		UJ	4		UJ	4		UJ	4		UJ	4		U	4		29		4	U	4							
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE	110	J	4	10	J	4	9	J	4	16	J	4	11	J	4	25		4	17	J	4	8	J	4	10	J	4	10	J	4	10		4	14		4	190		4	7	J	4				
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70	55	J+	5	11	5	10	J	5	18	J+	5	17	J	5	47		5	11	J+	5	9	J	5	120	J	5	130	J	5	100		5	14		5	28		5	5	J	5					
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		UJ	4		U	4		U	4		UJ	4		UJ	4		U	4		UJ	4		UJ	4		UJ	4		U	4		U	4		U	4		U	4							
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		UJ	5		U	5		U	5		UJ	5		UJ	5		U	5		UJ	5		U	5		UJ	5		U	5		U	5		U	5		U	5							
Total PFOA + PFOS	ng/l	NA	70	235		97		94		148		100		197		98		63		250		250		290		80		198		40																			

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Parameter	Unit	CAS	Sample ID N=Normal, FD=Field Duplicate	P-5U 10/7/2016			P-6_UPA 9/28/2016			UPA-101-TZ 9/28/2016			UPA-101-US 9/28/2016			AWC-E1 10/13/2016			AWC-E2 10/13/2016			AWC-E2 10/13/2016			AWC-K1 10/13/2016					
				Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL	Result	Qual	RDL			
Perfluorohexanoic acid	ng/l	307-24-4	NE	46		1	38	J-	1	47	J-	1	52		1	30		1	30		1	33		1	7		1			
Perfluoroheptanoic acid	ng/l	375-85-9	NE	23			1	33		1	22	J+	1	29	J+	1	15	J+	1	12		1	15		1	4	J+	1		
Perfluorooctanoic acid (PFOA)	ng/l	335-67-1	70	76			1	140	J-	1	130		1	210		1	76		1	110		1	130		1	23		1		
Perfluorononanoic acid	ng/l	375-95-1	NE	8			1	10		1	4		1	8		1	12	J+	1	6		1	5		1	2	J+	1		
Perfluorodecanoic acid	ng/l	335-76-2	NE	4			1	4		1		U	1	5		1	4		1	3		1	3		1	U	1			
Perfluoroundecanoic acid	ng/l	2058-94-8	NE	5			2		U	2		U	2		U	2		U	2		U	2		U	2		U	2		
Perfluorododecanoic acid	ng/l	307-55-1	NE		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		U	3			
Perfluorotridecanoic acid	ng/l	72629-94-8	NE		U	2		U	2		U	2		U	2		U	2		U	2		UJ	2		U	2			
Perfluorotetradecanoic acid	ng/l	376-06-7	NE		U	3		U	3		U	3		U	3		U	3		U	3		UJ	3		U	3			
Perfluorobutane Sulfonate	ng/l	29420-43-3	NE		U	4		U	4		U	4		U	4		U	4		U	4		U	4		U	4			
Perfluorohexane Sulfonate	ng/l	108427-53-8	NE		U	4	44		4	8	J	4	50	J+	4	8	J	4	30		4	26		4	6	J	4			
Perfluorooctane Sulfonate (PFOS)	ng/l	1763-23-1	70		U	5	21		5		U	5	37		5	11		5	14		5	15		5	6	J	5			
N-methyl perfluorooctanesulfonamidoacetic Acid	ng/l	2355-31-9	NE		U	4		U	4		UJ	4		U	4		U	4		U	4		U	4		U	4			
N-ethyl perfluorooctanesulfonamidoacetic Acid	ng/l	2991-50-6	NE		U	5		U	5		UJ	5		U	5		U	5		U	5		U	5		U	5			
Total PFOA + PFOS	ng/l	NA	70	76			161		130		247			87			124		145			29								

Table 2
September-October 2016 Semi-Annual Monitoring Program - Summary of Detected PFCs
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

Notes:

Green highlight = Concentration exceeds HA

Abbreviations:

HA = the May 19, 2016 USEPA health advisory (HA) of 70 nanograms per liter (ng/l; parts per trillion [ppt]) for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and/or the combined concentrations of PFOA and PFOS

ng/L = nanograms per liter

Qual = interpreted qualifier

RDL = reporting detection limit

NE = standard does not exist

PFCs = perfluorinated compounds

Qualifiers:

J - The analyte is present; however, the reported value may not be accurate or precise.

J+ - The analyte is present; however, the reported value may not be accurate or precise. The result is biased high.

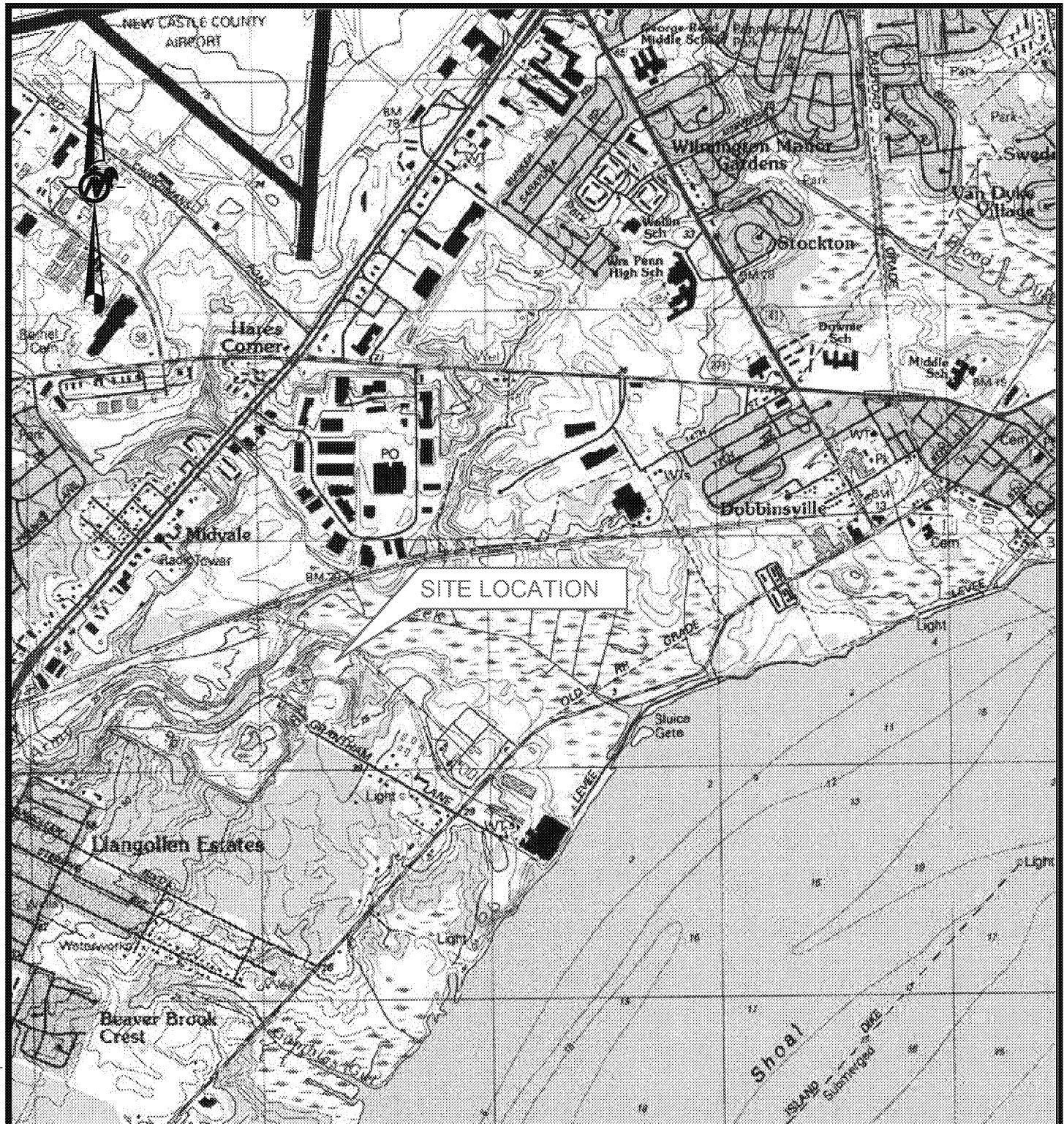
J- - The analyte is present; however, the reported value may not be accurate or precise. The result is biased low.

U - not detected above RDL

UJ - not detected above RDL, RDL is estimated

Prepared by: AZ
Checked by: BPC
Reviewed by: RWB

FIGURES



Feb 25, 2016 - 3:48pm

Drawing file: 0136052Z006.dwg

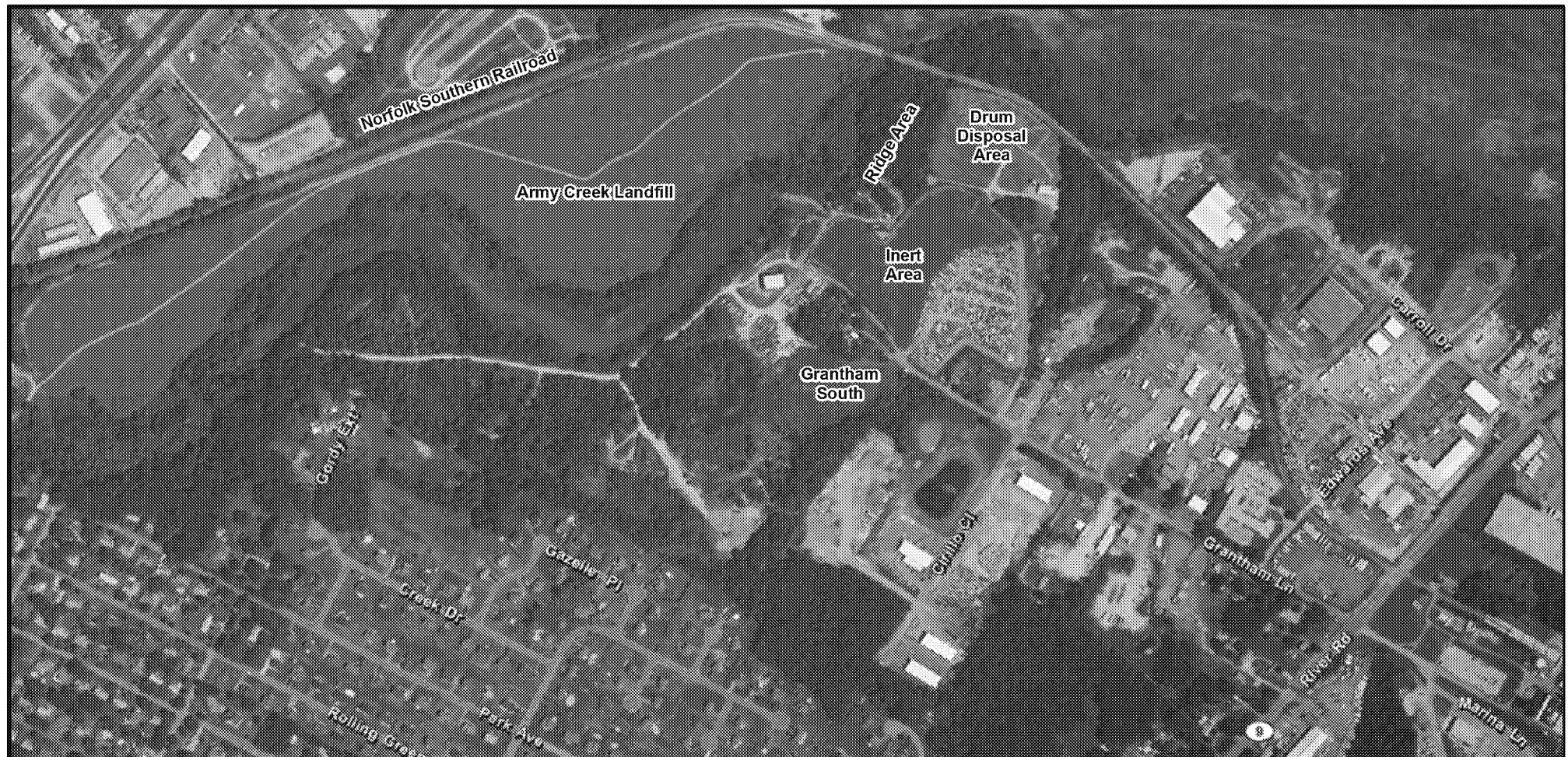
REFERENCE

- 1.) BASE MAP TAKEN FROM U.S.G.S. 7.5 MINUTE QUADRANGLE OF WILMINGTON SOUTH, DELAWARE, DATED 1993.

2000 0 2000
SCALE FEET

 Golder Associates Manchester, New Hampshire	SCALE	AS SHOWN	TITLE
	DATE	08/10/12	
DESIGN	RWB		
CADD	MPB		
FILE No.	0136052Z006.dwg	CHECK	RWB
PROJECT No.	013-6052	REV.	0
		REVIEW	TAM
DELAWARE SAND AND GRAVEL SUPERFUND SITE			FIGURE 1

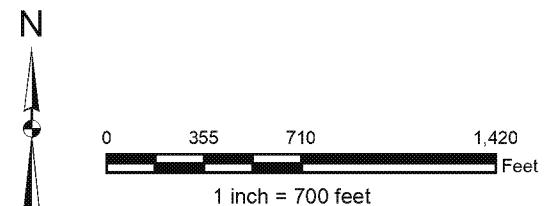
SITE LOCUS MAP



REFERENCES

Base Imagery taken from United States Department of Agriculture (USDA) National Agriculture Imagery Program (NAIP), 2008.

Spatial Reference:
NAD 1983 HARN StatePlane Delaware FIPS 0700



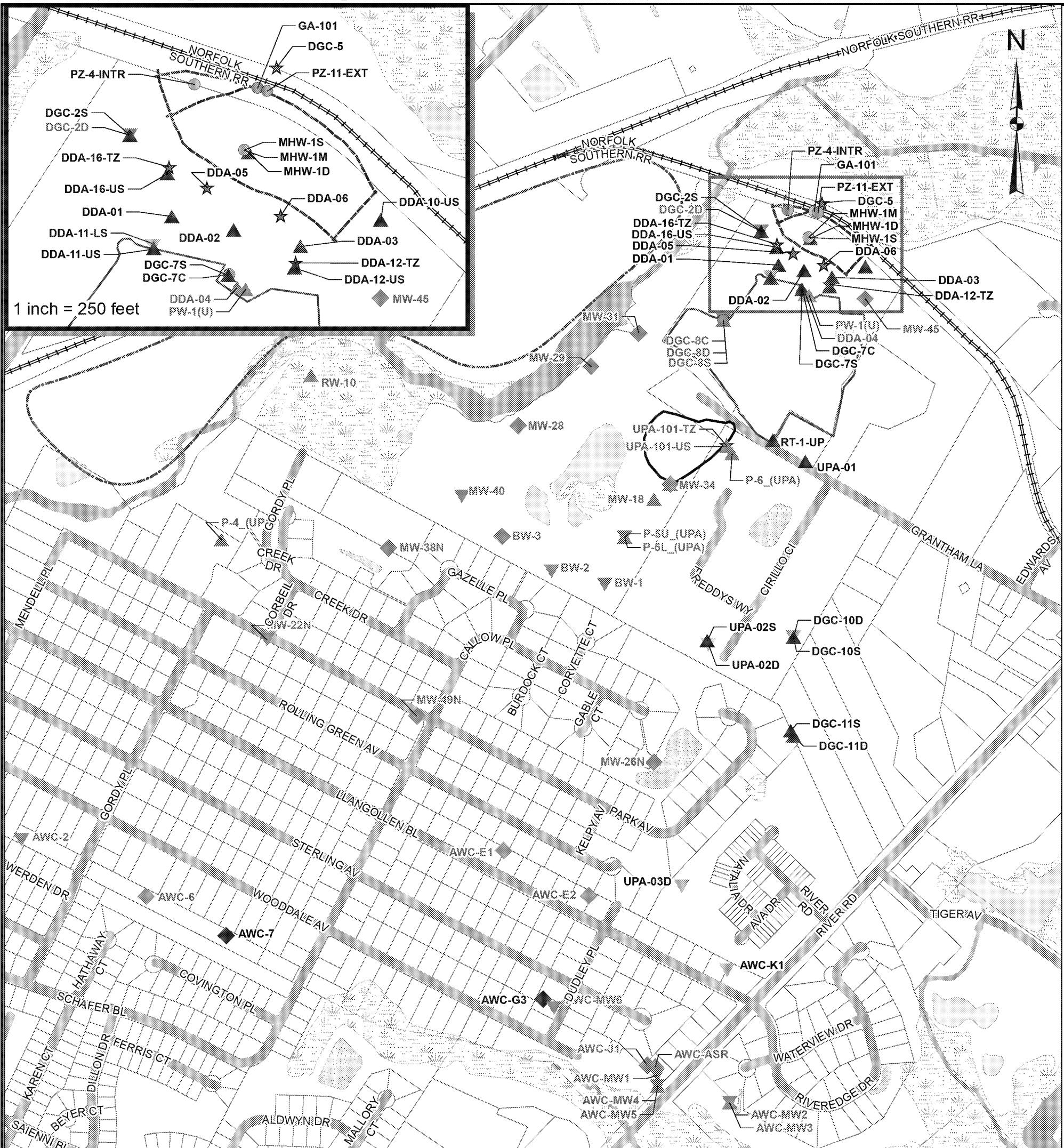
GENERAL SITE LAYOUT

PROJECT
**Delaware Sand and Gravel
Superfund Site
New Castle, Delaware**



FIGURE 2

TITLE	
FILE No.	Base Site Image
PROJECT No.	013-6052
REV. 0	SCALE AS SHOWN
DESIGN	CDS
GIS	CDS
CHECK	RWB
REVIEW	TAM
	8/30/2012



LEGEND

- ★ Well screened in UPCU Transition Zone included in DS&G's approved 2011 monitoring program
- ▲ Well screened in UPA Upper Sand included in DS&G's approved 2011 monitoring program
- ▲ Well screened in UPA Upper Sand not included in DS&G's approved 2011 monitoring program
- ▼ Well screened in UPA Lower Sand included in DS&G's approved 2011 monitoring program
- ▼ Well screened in UPA Lower Sand not included in DS&G's approved 2011 monitoring program
- ◆ Well screened across UPA Upper Sand and Lower Sand included in DS&G's approved 2011 monitoring program
- ◆ Well screened across UPA Upper Sand and Lower Sand not included in DS&G's approved 2011 monitoring program
- Well screened in Columbia Aquifer included in DS&G's approved 2011 monitoring program
- Well screened in Columbia Aquifer not included in DS&G's approved 2011 monitoring program

REFERENCE

Base data from New Castle County Delaware, Department of Land Use, "eParcel View Map" web site GIS data download. Data acquired 01/18/2012.

0 300 600 1,200
Feet

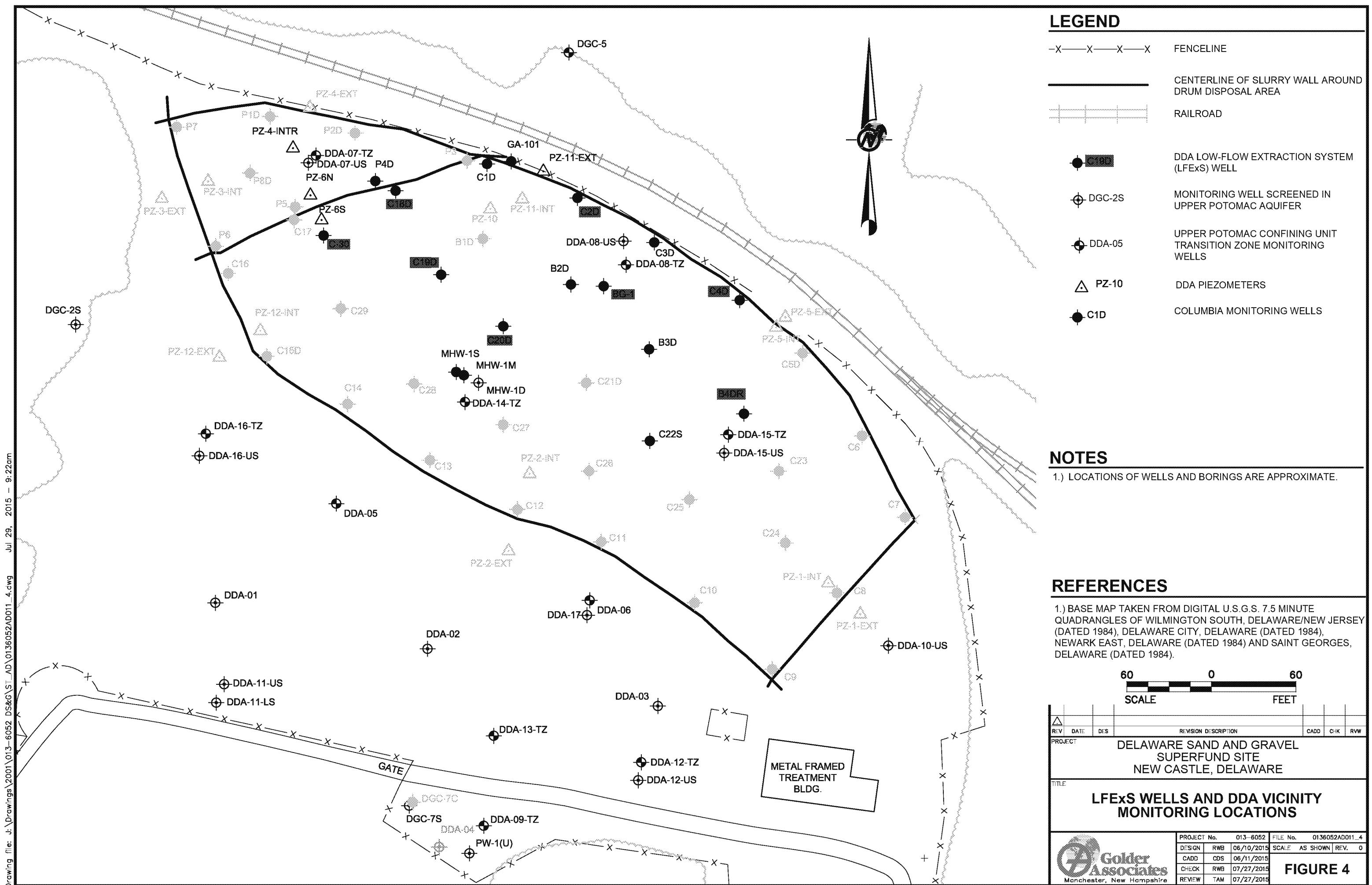
1 inch = 600 feet

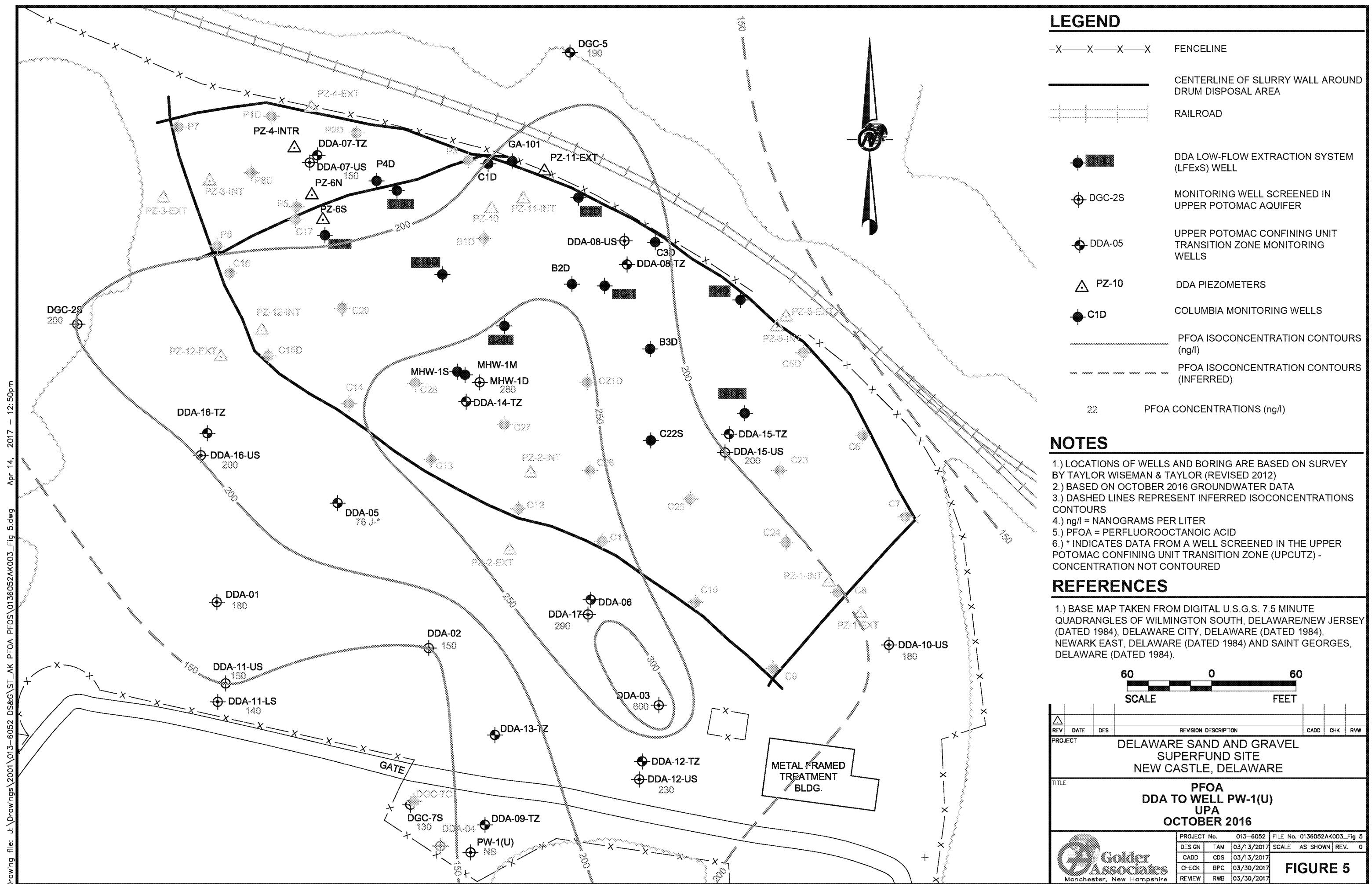
FIGURE 3

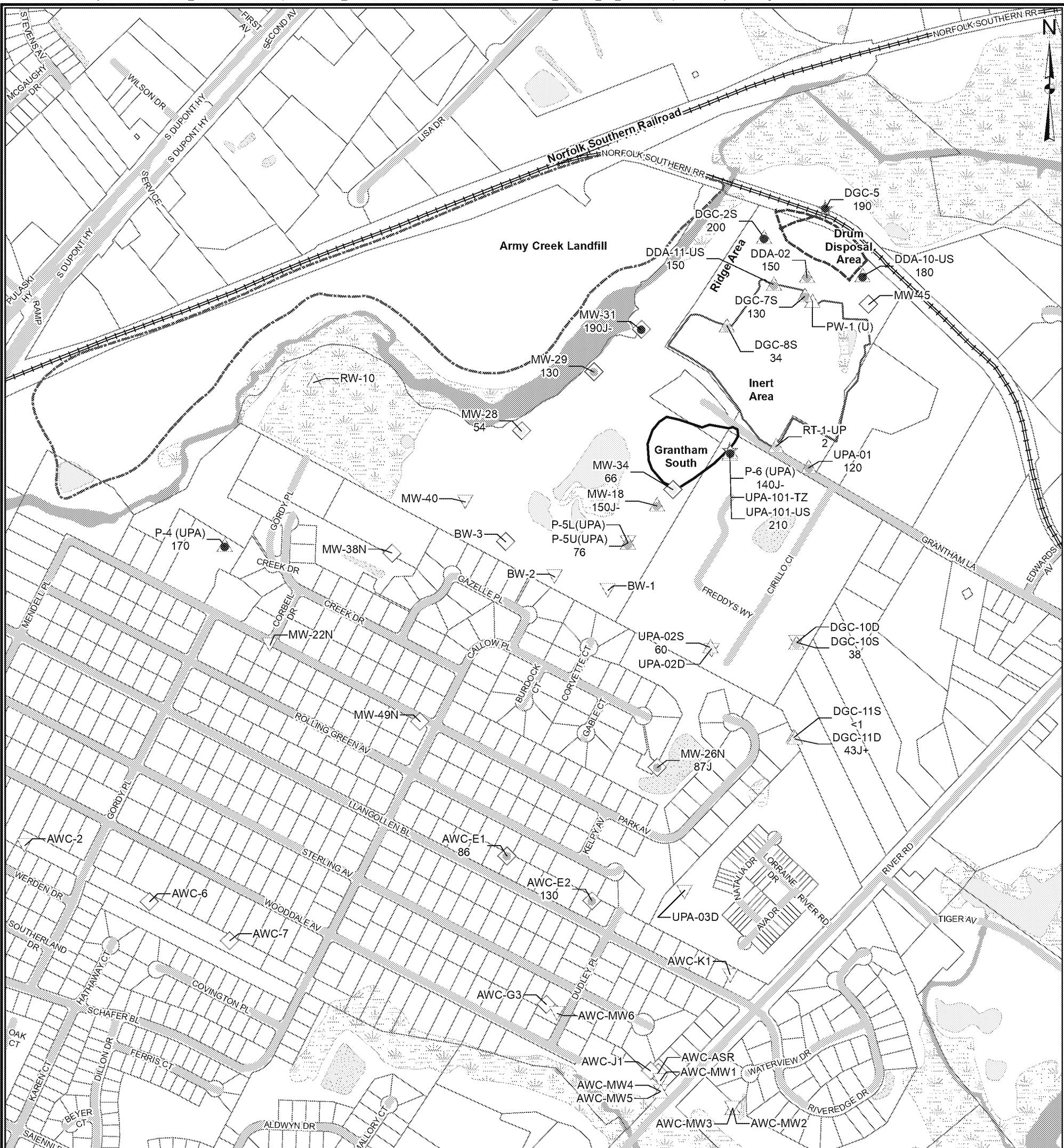
DOWNGRADIENT UPA MONITORING WELL LOCATIONS

**Delaware Sand and Gravel Superfund Site
New Castle, Delaware**









LEGEND

- ★ Well screened in UPCU Transition Zone
 - ▲ Well screened in UPA Upper Sand
 - ▼ Well screened in UPA Lower Sand
 - ◆ Well screened across UPA Upper Sand and Lower Sand
 - Well screened in Columbia Aquifer
- PFOA Detections
- <40
 - 40-70
 - 70-150
 - >150
- 23 PFOA Concentrations (ng/L)

REFERENCE

Base data from New Castle County Delaware, Department of Land Use, "eParcel View Map" web site GIS data download. Data acquired 01/18/2012.

PFOA = Perfluorooctanoic Acid
ng/L = Nanograms per Liter
* Indicates data not used for contouring

0 300 600 1,200 Feet

FIGURE 6

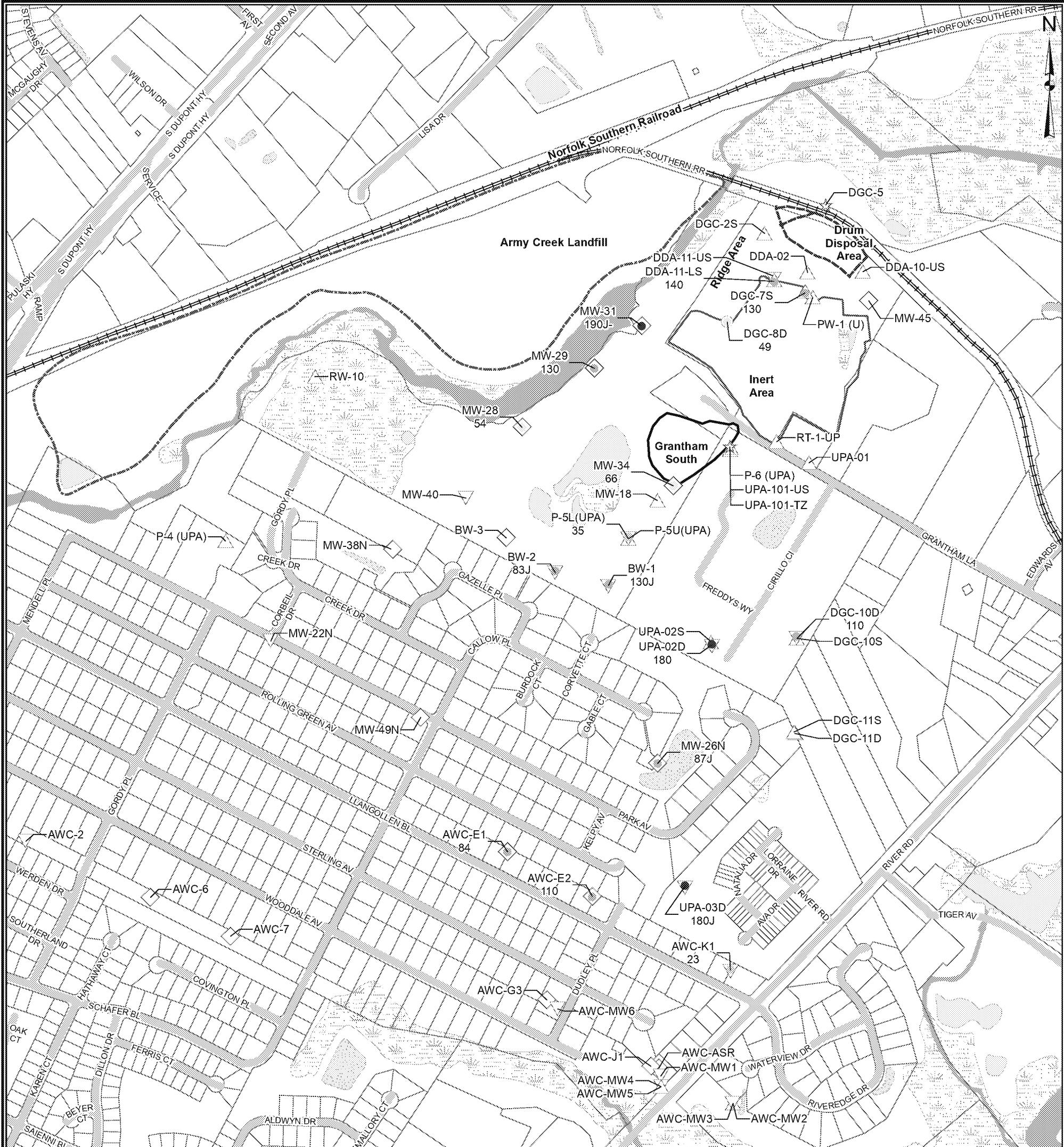
PROJECT No. 013-6052-007
FILE No. J0136052C054R1_Oct2016_US_PFOA
REV. 0 SCALE: AS SHOWN
DESIGN RWB 3/30/2017
GIS CDS 3/30/2017
CHECK RMB 3/30/2017
REVIEW TAM 3/30/2017

**PFOA
UPA UPPER SAND
OCTOBER 2016**

PROJECT

**Delaware Sand and Gravel
Superfund Site
New Castle, Delaware**





LEGEND

- ★ Well screened in UPCU Transition Zone
 - ▲ Well screened in UPA Upper Sand
 - ▼ Well screened in UPA Lower Sand
 - ◆ Well screened across UPA Upper Sand and Lower Sand

Well screen

- | Sample Type | PFOA Concentration (ng/L) | Count |
|-------------|---------------------------|-------|
| Water | <40 | 10 |
| | 40-70 | 10 |
| | 70-150 | 10 |
| | >150 | 10 |
| Soil | <40 | 10 |
| | 40-70 | 10 |
| | 70-150 | 10 |
| | >150 | 10 |
| Sediment | <40 | 10 |
| | 40-70 | 10 |
| | 70-150 | 10 |
| | >150 | 10 |

23 PFOA Concentrations (ng/L)

REFERENCE

Base data from New Castle County Delaware, Department of Land Use,
"eParcel View Map" web site GIS data download. Data acquired 01/18/2012.

PFOA = Perfluorooctanoic Acid
ng/L = Nanograms per Liter
* Indicates data not used for contouring

PFOA
UPA LOWER SAND
OCTOBER 2016

Delaware Sand and Gravel Superfund Site New Castle, Delaware



FIGURE 7

APPENDIX A
DATA QUALITY
ASSESSMENTS SEPTEMBER-
OCTOBER 2016 PFCs
GROUNDWATER MONITORING
EVENT
(Includes Form 1s)

Data Quality Assessment
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, DE

This report presents the findings of the data quality assessment performed on the analyses of environmental samples collected for the perfluoroalkyl compounds (PFCs) during the October 2016 Groundwater Monitoring Event. The groundwater monitoring was conducted at the Delaware Sand and Gravel (DS&G) Superfund Site (Site), located in New Castle, Delaware. Samples for this Monitoring Event were collected between September 27, 2016 and October 14, 2016. The chemical data for samples collected at the Site were evaluated to identify data quality issues which could affect the use of the data for decision making purposes. A total of 46 primary samples and the following Quality Assurance/Quality Control (QA/QC) samples were collected:

- Eleven (11) trip blanks;
- Eleven (11) field blanks;
- Four (4) equipment rinsate blanks;
- Four (4) matrix spike / matrix spike duplicate (MS/MSD) samples; and
- Four (4) field duplicate parameter sets.

All samples were analyzed for fourteen (14) PFCs² by Eurofins Lancaster Laboratories of Lancaster, Pennsylvania utilizing the following methodology:

- PFCs by United States Environmental Protection Agency (USEPA) Method 537, Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), Version 1.1 (September 2009)

Information regarding the sample point identifications, analytical methods, QC samples, sampling dates, and contract laboratory sample delivery group (SDG) designations are summarized in Table 1.

All groundwater results were validated following guidelines provided by USEPA Contract Laboratory Program (CLP) National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (September 2016), as applicable to the above listed analytical method. In general, chemical results for the

² Reported PFCs include: Perfluorobutane Sulfonate, Perfluorohexanoic acid, Perfluorohexane Sulfonate, Perfluoroheptanoic acid, Perfluoroctanoic acid (PFOA), Perfluorooctane sulfonate (PFOS), Perfluorononanoic acid, Perfluorodecanoic acid, Perfluoroundecanoic acid, Perfluorododecanoic acid, Perfluorotridecanoic acid, Perfluorotetradecanoic acid, N-methyl perfluorooctanesulfonamidoacetic Acid, and N-ethyl perfluorooctanesulfonamidoacetic Acid

samples collected at the Site were qualified on the basis of outlying precision or accuracy parameters, or on the basis of professional judgment. The following definitions provide a brief explanation of the qualifiers which may have been assigned to data during the data evaluation process.

- J** The analyte is present; however, the reported value may not be accurate or precise.
- J-** The analyte is present; however, the reported value may not be accurate or precise. The result is biased low.
- J+** The analyte is present; however, the reported value may not be accurate or precise. The result is biased high.
- UJ** The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate.

The data generated during this Groundwater Monitoring Event met the QC criteria established in the respective USEPA method and CLP guidelines, except as noted below. Qualifications may not have been required for all samples. Table 2 summarizes detailed qualifications applied to the data.

- All sample results in SDG DSG02 were qualified as estimated (J/UJ) when, due to laboratory error, samples were extracted outside the 14-day hold time.
- Select results were qualified as biased low for detected results (J-) and estimated for non-detect results (UJ) when surrogate recoveries were below QC criteria.
- Select results were qualified as biased high (J+) when surrogate recoveries were above QC criteria.
- Certain perfluorobutanesulfonate and n-ethyl perfluorooctanesulfonamidoacetic acid results were qualified as estimated (UJ) when the associated laboratory control sample recoveries were below QC criteria.
- Certain results were qualified as biased low (J-) when internal standard areas were above QC criteria.
- Select results were qualified as biased high for detected results (J+) and estimated for non-detect results (UJ) when internal standard areas were below QC criteria.
- Select results were qualified as estimated (J) when surrogate recoveries and internal standard areas were both below QC criteria, or when surrogate recoveries and internal standard areas were both above QC criteria.

Based on the data evaluations and data quality assessment, the analytical data for samples collected at the Site were determined to be acceptable (including estimated data) for their intended use. Generally acceptable levels of accuracy and precision, based on LCS, MS/MSD, field duplicate, and surrogate recoveries, were achieved for the data. In addition, the data completeness (i.e. the ratio of the amount of valid data obtained to the amount expected, including estimated data (J/J+/J-/UJ)) was 100%.

Sample Point Identifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Field ID	Matrix	Sample Date	PFCs	Field Duplicate	MS/MSD
Primary Samples						
DSG01	DDA-11-US	GW	9/27/2016	X		
DSG01	DDA-11-LS	GW	9/27/2016	X		
DSG01	DDA-16-US	GW	9/27/2016	X		
DSG01	DDA-01	GW	9/27/2016	X		
DSG01	DGC-2S	GW	9/27/2016	X		
DSG01	DDA-05	GW	9/27/2016	X		
DSG01	UPA-101-T2	GW	9/28/2016	X		
DSG01	UPA-101-US	GW	9/28/2016	X		
DSG01	P-6 (UPA)	GW	9/28/2016	X		
DSG01	DDA-02	GW	9/28/2016	X		
DSG01	DDA-17	GW	9/28/2016	X		
DSG01	DGC-10S	GW	9/29/2016	X		
DSG01	DGC-10D	GW	9/29/2016	X		
DSG01	UPA-02S	GW	9/29/2016	X		
DSG01	UPA-02D	GW	9/29/2016	X		
DSG01	DDA-12-US	GW	9/29/2016	X		
DSG01	DDA-03	GW	9/29/2016	X		
DSG02	FDGW_100316	GW	10/3/2016	X	X (UPA-03D)	
DSG02	UPA-03D	GW	10/3/2016	X		
DSG02	MW-26N	GW	10/3/2016	X		X
DSG02	DGC-11D	GW	10/3/2016	X		
DSG02	DGC-11S	GW	10/3/2016	X		
DSG02	BW-2	GW	10/4/2016	X		
DSG02	BW-1	GW	10/4/2016	X		
DSG02	DDA-10-US	GW	10/5/2016	X		
DSG02	FDGW_100516	GW	10/5/2016	X	X (MW-29)	
DSG02	MW-29	GW	10/5/2016	X		
DSG03	MW-31	GW	10/5/2016	X		X
DSG03	RT-1UP	GW	10/5/2016	X		
DSG03	MW-28	GW	10/5/2016	X		
DSG03	DGC-8D	GW	10/6/2016	X		
DSG03	DGC-8S	GW	10/6/2016	X		
DSG03	MHW-1D	GW	10/6/2016	X		
DSG03	DDA-15-US	GW	10/6/2016	X		
DSG03	UPA-01	GW	10/6/2016	X		
DSG03	MW-18	GW	10/7/2016	X		
DSG03	MW-34	GW	10/7/2016	X		
DSG03	P-5L (UPA)	GW	10/7/2016	X		
DSG03	P-5U (UPA)	GW	10/7/2016	X		
DSG05	FDGW_101016	GW	10/10/2016	X	X (DGC-5)	
DSG05	DGC-5	GW	10/10/2016	X		
DSG05	DDA-07-US	GW	10/10/2016	X		X
DSG05	DGC-7S	GW	10/10/2016	X		
DSG05	FDGW_101316	GW	10/13/2016	X	X (AWC-E1 (132))	
DSG05	AWC-E1 (132)	GW	10/13/2016	X		
DSG05	AWC-E2 (140)	GW	10/13/2016	X		X
DSG05	AWC-E1 (156)	GW	10/13/2016	X		
DSG05	AWC-K1	GW	10/13/2016	X		
DSG05	AWC-E2(165)	GW	10/13/2016	X		
DSG05	P-4 (UPA)	GW	10/14/2016	X		
Rinse Blanks						
DSG01	RBGW1_092716	WQ	9/27/2016	X		
DSG01	RBGW2_092716	WQ	9/27/2016	X		
DSG01	RBGW3_092716	WQ	9/27/2016	X		
DSG01	RBGW4_092716	WQ	9/27/2016	X		

Sample Point Identifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Field ID	Matrix	Sample Date	PFCs	Field Duplicate	MS/MSD
Field Blanks						
DSG01	FBGW_092716	WQ	9/27/2016	X		
DSG01	FBGW_092816	WQ	9/28/2016	X		
DSG01	FBGW_092916	WQ	9/29/2016	X		
DSG02	FBGW_100316	WQ	10/3/2016	X		
DSG02	FBGW_100416	WQ	10/4/2016	X		
DSG02	FBGW_100516	WQ	10/5/2016	X		
DSG03	FBGW_100616	WQ	10/6/2016	X		
DSG03	FBGW_100716	WQ	10/7/2016	X		
DSG05	FBGW_101016	WQ	10/10/2016	X		
DSG05	FBGW_101316	WQ	10/13/2016	X		
DSG05	FBGW_101416	WQ	10/14/2016	X		
Trip Blanks						
DSG01	TBGW_092716	WQ	9/27/2016	X		
DSG01	TBGW_092816	WQ	9/28/2016	X		
DSG01	TBGW_092916	WQ	9/29/2016	X		
DSG02	TBGW_100316	WQ	10/3/2016	X		
DSG02	TBGW_100416	WQ	10/4/2016	X		
DSG02	TBGW_100516	WQ	10/5/2016	X		
DSG03	TBGW_100616	WQ	10/6/2016	X		
DSG03	TBGW_100716	WQ	10/7/2016	X		
DSG05	TBGW_101016	WQ	10/10/2016	X		
DSG05	TBGW_101316	WQ	10/13/2016	X		
DSG05	TBGW_101416	WQ	10/14/2016	X		

Abbreviations:

GW - Groundwater

MS/MSD - Matrix Spike / Matrix Spike Duplicate

PFCs - Perfluoroalkyl compounds

SDG - Sample Delivery Group

WQ - Water, Quality Control

Table 2
Data Qualifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Sample Name	Constituent	New Result	New RL	Qualifier	Reason
DSG01	DDA-11-US	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-11-LS	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-16-US	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-01	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DGC-2S	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-05	Perfluorobutanesulfonate	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-11-US	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-11-LS	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-16-US	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-01	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DGC-2S	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	DDA-05	n-Ethyl Perfluorooctanesulfonamidoacetic Acid	-	-	UJ	LCS/LCSD recovery below QC criteria
DSG01	UPA-101-TZ	Perfluoroheptanoic acid	-	-	J+	IS below QC criteria
DSG01	UPA-101-US	Perfluoroheptanoic acid	-	-	J+	IS below QC criteria
DSG01	DDA-02	Perfluoroheptanoic acid	-	-	J-	IS above QC criteria
DSG01	DDA-11-LS	Perfluoroheptanoic acid			J+	Surrogate recovery above QC criteria
DSG01	DDA-16-US	Perfluoroheptanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-17	Perfluoroheptanoic acid	-	-	J+	IS below QC criteria / Surrogate recovery above QC criteria
DSG01	UPA-101-TZ	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	UPA-101-TZ	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	DDA-02	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria
DSG01	DGC-10S	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	UPA-02S	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	UPA-02S	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	DDA-12-US	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria
DSG01	DDA-03	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	J	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	DDA-03	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	IS below QC criteria / Surrogate recovery below QC criteria
DSG01	DDA-03	Perfluoroheptanoic acid	-	-	J-	IS above QC criteria
DSG01	DDA-11-LS	Perfluorooctane Sulfonate (PFOS)	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria
DSG01	DDA-11-LS	Perfluorononanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria
DSG01	DDA-16-US	Perfluorononanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria
DSG01	DDA-11-LS	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-11-LS	Perfluorohexane Sulfonate	-	-	J+	Surrogate recovery above QC criteria

Table 2
Data Qualifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Sample Name	Constituent	New Result	New RL	Qualifier	Reason
DSG01	DDA-16-US	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-16-US	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-01	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DGC-2S	Perfluorohethanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DGC-2S	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG01	DGC-2S	Perfluorononanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-05	Perfluorododecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DDA-05	Perfluorotridecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DDA-05	Perfluorotetradecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DDA-05	Perfluorohexanoic acid	-	-	J-	Surrogate recovery below QC criteria
DSG01	DDA-05	Perfluorooctanoic acid (PFOA)	-	-	J-	Surrogate recovery below QC criteria
DSG01	UPA-101-TZ	Perfluorohexanoic acid	-	-	J-	Surrogate recovery below QC criteria
DSG01	UPA-101-US	Perfluorohexane Sulfonate	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-17	Perfluorohexane Sulfonate			J+	Surrogate recovery above QC criteria
DSG01	DDA-17	Perfluorononanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-17	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG01	DDA-17	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG01	P-6(UPA)	Perfluorohexanoic acid	-	-	J-	Surrogate recovery below QC criteria
DSG01	P-6(UPA)	Perfluorooctanoic acid (PFOA)	-	-	J-	Surrogate recovery below QC criteria
DSG01	DGC-10S	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DGC-10D	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DGC-10D	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	UPA-02S	Perfluorododecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	UPA-02S	Perfluorotridecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	UPA-02S	Perfluorotetradecanoic acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	UPA-02D	N-methyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	UPA-02D	N-ethyl perfluorooctanesulfonamidoacetic Acid	-	-	UJ	Surrogate recovery below QC criteria
DSG01	DDA-03	Perfluoroundecanoic acid			UJ	Surrogate recovery below QC criteria
DSG01	DDA-03	Perfluorododecanoic acid			UJ	Surrogate recovery below QC criteria
DSG01	DDA-03	Perfluorotridecanoic acid			UJ	Surrogate recovery below QC criteria
DSG01	DDA-03	Perfluorotetradecanoic acid			UJ	Surrogate recovery below QC criteria
DSG02	FDGW_100316	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	UPA-03D	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	MW-26N	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	DGC-11D	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	DGC-11S	All results	-	-	UJ	Sample extracted outside 14-day hold time
DSG02	BW-2	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	BW-1	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	DDA-10-US	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	FDGW_100516	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	MW-29	All results	-	-	J/UJ	Sample extracted outside 14-day hold time
DSG02	DGC-11D	Perfluorodecanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.

Table 2
Data Qualifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Sample Name	Constituent	New Result	New RL	Qualifier	Reason
DSG02	DDA-10-US	Perfluorodecanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	FDGW-100316	Perfluoroheptanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	FDGW-100316	Perfluorononanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	DGC-11D	Perfluoroheptanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	DGC-11D	Perfluorononanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	DDA-10-US	Perfluorononanoic acid	-	-	J	IS above QC criteria / Surrogate recovery above QC criteria.
DSG02	MW-26N	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	MW-26N	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	MW-26N	Perfluorononanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	FDGW-100316	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	FDGW-100316	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	FDGW-100316	Perfluorohexane Sulfonate	-	-	J+	Surrogate recovery above QC criteria
DSG02	UPA-03D	Perfluorodecanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	UPA-03D	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	UPA-03D	Perfluorononanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	DGC-11D	Perfluorooctanoic acid (PFOA)	-	-	J+	Surrogate recovery above QC criteria
DSG02	DGC-11D	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	BW-1	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	BW-1	Perfluorononanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	DDA-10-US	Perfluorooctane Sulfonate (PFOS)	-	-	J+	Surrogate recovery above QC criteria
DSG02	MW-26N	Perfluoroheptanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG02	UPA-03D	Perfluoroheptanoic acid	-	-	J+	Surrogate recovery above QC criteria
DSG03	MW-31	Perfluorododecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG03	MW-31	Perfluorotridecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG03	MW-31	Perfluorotetradecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG03	MW-31	Perfluorohexanoic acid	--	--	J-	Surrogate recovery below QC criteria
DSG03	MW-31	Perfluorooctanoic acid (PFOA)	--	--	J-	Surrogate recovery below QC criteria
DSG03	MW-28	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	DGC-8D	Perfluorodecanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	DGC-8D	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	DGC-8S	Perfluorohexanoic acid	--	--	J-	Surrogate recovery below QC criteria
DSG03	MHW-1D	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	DDA-15-US	Perfluorodecanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	DDA-15-US	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG03	UPA-01	Perfluorohexanoic acid	--	--	J-	Surrogate recovery below QC criteria
DSG03	MW-18	Perfluorohexanoic acid	--	--	J-	Surrogate recovery below QC criteria
DSG03	MW-18	Perfluorooctanoic acid (PFOA)	--	--	J-	Surrogate recovery below QC criteria
DSG03	P-5L (UPA)	Perfluoroheptanoic acid	--	--	J+	Surrogate recovery above QC criteria

Table 2
Data Qualifications
September-October 2016 PFCs Groundwater Monitoring Event
Delaware Sand & Gravel Superfund Site
New Castle, Delaware

SDG	Sample Name	Constituent	New Result	New RL	Qualifier	Reason
DSG03	P-5L (UPA)	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	AWC-E1 (156)	Perfluoroheptanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	AWC-E1 (156)	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	AWC-K1	Perfluoroheptanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	AWC-K1	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	AWC-E2 (165)	Perfluorododecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG05	AWC-E2 (165)	Perfluorotridecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG05	AWC-E2 (165)	Perfluorotetradecanoic acid	--	--	UJ	Surrogate recovery below QC criteria
DSG05	FDGW_101016	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	DGC-5	Perfluoroheptanoic acid	--	--	J+	Surrogate recovery above QC criteria
DSG05	DGC-5	Perfluorononanoic acid	--	--	J+	Surrogate recovery above QC criteria

Abbreviations:

IS - internal standard

LCS/LCSD - laboratory control sample / laboratory control sample duplicate

QC - quality control

RL - reporting limit

SDG - sample delivery group

Qualifiers:

J : estimated result

UJ : non-detect result; estimated RL

J- : biased low result

J+ : biased high result

December 14, 2016

Ms. Theresa Miller
Golder Associates, Inc.
670 North Commercial Street, Suite 103
Manchester, NH 03101

Dear Theresa:

Per your request, Eurofins Lancaster Laboratories Environmental, LLC (ELLE) has investigated the mishandling of samples for ELLE entry group 1718978, samples 8635689-8635693 and samples 8635695-8635705. The investigation showed that the sample mishandling occurred during sample preparation. An Investigation and Corrective Action Report (ICAR) was issued. Department Management investigated the issues and the response was reviewed by QA. The information has been routed to ELLE senior management. The investigation is summarized below:

While reviewing the raw data, the analyst noticed that the results did not make sense for the batch Quality Control (QC) samples. The analyst checked the numbering on the extract vials to make sure they were correct. Then the analysts pulled remaining volume for each of the sample extracts and re-analyzed the extracts. The re-analyses of the initial extracts matched the initial analyses. This information indicated that the mishandling of the sample extracts occurred during the sample preparation process. As a matter of course, all samples were re-prepared and re-analyzed. Unfortunately, the re-extraction of all samples occurred outside of the technical holding time for sample extraction.

The manager of the Specialty Services department investigated the sample preparation issue. Initially, all sample containers are lined up next to extraction glassware set-ups and are labeled to match. There are two main points of transfer during the extraction process and with each transfer step the extracts are transferred from one set of labeled glassware to another. It is during one or both of the transfer steps that the mishandling/mislabeling of samples occurred. However, it cannot be ascertained in which step or steps the mishandling occurred. As corrective action, changes were implemented for both steps of the sample preparation process to minimize reoccurrence of sample mishandling. One of the corrective actions entailed how equipment was set-up. For this method, the extraction set-up is accessible from two sides (front and back). The process for equipment set-up has been changed to always be performed from one specific side to ensure that the correct sample is grabbed. The other corrective action entailed a change to the labeling program so that the sample labels would print in order of the set-up and not a random order and reduce the likelihood that an incorrect label was affixed the sample extracts. Furthermore, all personnel were re-trained on these procedure changes and reminded of the importance of proper sample handling/labeling.

I apologize for the errors with this data set and any inconvenience to you. Should you have any questions about the information provided, please contact me at 717-556-7327

Sincerely,



Ruth Callaghan
Principal Specialist
Quality Assurance

RC/mc

cc: Nicole Maljovec (ELLE)
Alison Zoll (email)
Ross Bennett (email)



Lancaster Laboratories
Environmental

Analysis Report

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REVISED

Sample Description: RBGW1-092716 Rinsate Water
Delaware Sand & Gravel

LL Sample # WW 8619351
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 09:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

RBGW1 SDG#: DSG01-01RB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorooctanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NMeFOSAA	2391-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 05:39	Jason W Knight	1
14091	FFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



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Environmental

Analysis Report

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REVISED

Sample Description: RBGW2-092716 Rinsate Water
Delaware Sand & Gravel

LL Sample # WW 8619352
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 09:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

RBGW2 SDG#: DSG01-02RB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-75-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NETFOSSAA	2991-50-6	N.D.	5	8	1
	NETFOSSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSSAA	2355-31-9	N.D.	4	8	1
	NMeFOSSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 06:12	Jason W Knight	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: RBGW3-092716 Rinsate Water
Delaware Sand & Gravel

LL Sample # WW 8619353
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 09:45 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

RBGW3 SDG#: DSG01-03RB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	1 J	1	2	1
10954	Perfluorooctanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NMeFOSAA	2891-50-6	N.D.	5	8	1
	NMeFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 06:28	Jason W Knight	1
14091	PFAs Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: RBGW4-092716 Rinsate Water
Delaware Sand & Gravel

LL Sample # WW 8619354
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 09:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

RBGW4 SDG#: DSG01-04RB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	3	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NEtFOSAA	2991-80-6	N.D.	5	8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 06:44	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whaley	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: TBGW-092716 Trip Blank Water
Delaware Sand & Gravel

LL Sample # WW 8619355
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

TBGW1 SDG#: DSG01-06TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NEtFOSAA	2891-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 07:01	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



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Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

REVISED

Sample Description: FBGW-092716 Field Blank Water
Delaware Sand & Gravel

LL Sample # WW 8619356
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 11:04 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

FBGW1 SDG#: DSG01-05FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluoromonanoic acid	375-93-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	3	1
10954	Perfluoroundecanoic acid	3058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NEtFOCSAA	2991-50-6	N.D.	5	8	1
	NEtFOCSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOCSAA	2355-31-9	N.D.	4	8	1
	NMeFOCSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 07:17	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whaley	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: DDA-11-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619357
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 11:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

DD11U SDG#: DSG01-07

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	150	1	2	1
10954	Perfluorononanoic acid	375-95-1	13	1	2	1
10954	Perfluorodecanoic acid	335-76-2	3	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	27	1	2	1
10954	Perfluorheptanoic acid	375-85-9	23	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. UJ	4	10	1
10954	Perfluorhexanesulfonate	355-46-4	7 J	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	23	5	10	1
10954	NEtFOSAA	2391-50-6	N.D. UJ	5	8	1
	NEmFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2385-31-3	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 07:50	Jason W Knight	1
14091	PFAs Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



Lancaster Laboratories
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Analysis Report

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REVISED

Sample Description: DDA-11-LS Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619358
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 11:55 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DD11L SDG#: DSG01-08

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	140	1	2	1
10954	Perfluorochanoic acid	375-95-1	10 J^+	1	2	1
10954	Perfluorodecanoic acid	335-76-2	2 $\text{J}^+ \text{J}^+$	1	2	1
10954	Perfluoroundecanoic acid	3058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	25	1	2	1
10954	Perfluorohexanoic acid	375-65-9	20 J^+	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. J^+	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	14 J^+	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	14 J^+	5	10	1
10954	NETFOSAA	2991-56-6	N.D. J^+	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	6	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 08:06	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result

REVISED

Sample Description: DDA-16-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619359
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 14:40 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DDA16 SDG#: DSG01-09

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	200	1	2	1
10954	Perfluorononanoic acid	375-95-1	7 ^J	1	2	1
10954	Perfluorodecanoic acid	335-76-2	1 ^J	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	29	1	2	1
10954	Perfluorheptanoic acid	375-85-9	20 ^J	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^J	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	17	4	10	1
10954	Perfluoro-octanesulfonate	1761-23-1	17 ^J	5	10	1
10954	NETFOSAA	2991-50-6	N.D. ^J	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 08:23	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result



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Analysis Report

REVISED

Sample Description: DDA-01 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619360
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 15:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

DDA01 SDG#: DSG01-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	180	1	2	1
10954	Perfluorononanoic acid	375-95-1	10	1	2	1
10954	Perfluorodecanoic acid	335-76-2	2 ³ / ₄	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	3	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72628-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	29	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	22	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. NJ	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	41	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	29	5	10	1
10954	NMeFOSAA	2991-50-6	N.D. NJ	5	8	1
			NMeFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.			
10954	NMeFOSAA	2355-31-9	N.D.	4	6	1
			NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.			
			The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.			

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 08:39	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result

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REVISED

Sample Description: DGC-2S Grab Groundwater
Delaware Sand & GravelLL Sample # WW 8619361
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 15:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 09/30/2016 18:50

Mt. Laurel NJ 08054

Reported: 11/22/2016 14:19

DGC2S SDG#: DSG01-11

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	200	1	2	1
10954	Perfluorononanoic acid	375-95-1	9 J+	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	34	1	2	1
10954	Perfluorohethanoic acid	375-85-9	23 J+	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. UJ	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	6 J	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	12 J+	5	10	1
10954	NETFOSAA	2991-50-6	N.D. UJ	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 08:55	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*This limit was used in the evaluation of the final result

REVISED

Sample Description: DDA-05 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619362
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/27/2016 16:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DDA05 SDG#: DSG01-12

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	76 ^T ~	3	2	1
10954	Perfluorononanoic acid	375-95-1	2 ^T ~	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	2	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D. ^T ~	3	5	1
10954	Perfluorotridecanoic acid	72639-94-8	N.D. ^T ~	3	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. ^T ~	3	5	1
10954	Perfluorohexanoic acid	307-24-4	29 ^T ~	1	3	1
10954	Perfluoroheptanoic acid	375-85-9	13	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^T ~	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	7 ^T ~	5	10	1
10954	NMeFOSAA	2991-50-8	N.D. ^T ~	5	8	1
			NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.			
10954	NMeFOSAA	2388-31-9	N.D.	4	8	1
			NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.			
			The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.			

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16280013	10/18/2016 09:12	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16280013	10/07/2016 12:15	Devon M Whooley	1

*=This limit was used in the evaluation of the final result

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REVISED

Sample Description: TBGW-092816 Trip Blank Water
Delaware Sand & GravelLL Sample # WW 8619363
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

TBGW2 SDG#: DSG01-13TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NETFOSAA	2991-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 13:24	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*This limit was used in the evaluation of the final result

REVISED

Sample Description: UPA-101-TZ Grab Groundwater
Delaware Sand & GravelLL Sample # WW 8619364
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 11:40 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 09/30/2016 18:50

Mt. Laurel NJ 08054

Reported: 11/22/2016 14:19

UPATZ SDG#: DSG01-14

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc.	Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	130	1	2	1
10954	Perfluorononanoic acid	375-95-1	4	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-85-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	375-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	47 ^J ~	1	2	1
10954	Perfluorheptanoic acid	375-85-9	22 ^J +	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	3 ^J	4	10	1
10954	Perfluoro-octanesulfonate	1763-33-1	N.D. XX	5	10	1
10954	NETFOSSA	2991-50-6	N.D. ^J	5	8	1
10954	NETFOSSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSSAA	2355-31-9	N.D. ^J	4	8	1
10954	NMeFOSSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

AMZ
2/29/17

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 13:36	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*This limit was used in the evaluation of the final result



Lancaster Laboratories
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Analysis Report

REVISED

Sample Description: FBGW-092816 Field Blank Water
Delaware Sand & Gravel

LL Sample # WW 8619365
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 11:41 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

FBGW2 SDG#: DSG01-15FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72639-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	356-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NETFOSAA	2991-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 13:48	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: UPA-101-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619366
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 12:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

UPAUS SDG#: DSG01-16

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-87-1	210	1	2	1
10954	Perfluorononanoic acid	375-95-1	8	1	3	1
10954	Perfluorodecanoic acid	335-76-2	5	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	3	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	52	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	29 J*	1	3	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	50 J*	4	10	1
10954	Perfluoro-octanesulfonate	1763-33-1	37	5	10	1
10954	NETFOSAA	2991-80-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 14:00	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 08:30	Robert Brown	1

*=This limit was used in the evaluation of the final result

REVISED

Sample Description: P-6 (UPA) Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619367
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 13:15 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 09/30/2016 18:50

Mt. Laurel NJ 08054

Reported: 11/22/2016 14:19

P-6PA SDG#: DSG01-17

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	140 J^-	1	2	1
10954	Perfluorononanoic acid	375-95-1	10	1	2	1
10954	Perfluorodecanoic acid	335-76-2	4	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-95-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	38 J^-	1	2	1
10954	Perfluorohethanoic acid	375-85-9	33	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	44	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	21	5	10	1
10954	NETFOSAA	2991-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 16:59	Jason W. Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: DDA-02 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619368
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 15:35 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DDA02 SDG#: DSG01-18

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	150	1	2	1
10954	Perfluoromonanoic acid	375-95-1	12	1	2	1
10954	Perfluorodecanoic acid	335-76-2	1	1	2	1
10954	Perfluoroundecanoic acid	2056-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	25	1	2	1
10954	Perfluorheptanoic acid	375-85-9	22	1	3	1
10954	Perfluorobutanesulfonate	375-73-5	6	3	10	1
10954	Perfluorhexanesulfonate	355-46-4	19	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	18	5	10	1
10954	NETFOSAA	2991-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D. Q/T	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 14:34	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: DDA-17 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619369
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/28/2016 15:45 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

DDA17 SDG#: DSG01-19

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	290	1	2	1
10954	Perfluorononanoic acid	375-95-1	7 J^+	1	2	1
10954	Perfluorodecanoic acid	335-76-2	2 J^+	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	57	1	2	1
10954	Perfluorheptanoic acid	375-85-9	34 J^+	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	56 J^+	4	10	1
10954	Perfluoro-octanesulfonate	1761-23-1	34 J^+	5	10	1
10954	NEtFOSAA	2991-50-6	N.D.	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 14:47	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

REVISED

Sample Description: TBCW-092916 Trip Blank Water
Delaware Sand & Gravel

LL Sample # WW 8619370
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

TBGW3 SDG#: DSG01-20TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-93-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-34-8	N.D.	3	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridodecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NEtFOSSAA	2391-50-6	N.D.	5	8	1
10954	NEtFOSSAA					
10954	NEtFOSSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSSAA	2355-31-9	N.D.	4	6	1
10954	NMeFOSSAA					
10954	NMeFOSSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 14:59	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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REVISED

Sample Description: FBGW-092916 Field Blank Water
Delaware Sand & Gravel

LL Sample # WW 8619371
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 10:44 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

FBGW3 SDG#: DSG01-21FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	2	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	2	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	3	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NETFOSAA	2991-50-6	N.D.	5	8	1
10954	NETFOSAA					
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	8	1
10954	NMeFOSAA					
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 15:11	Jason W Knight	1
14091	PFAs Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result

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REVISED

Sample Description: DGC-10S Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619372
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 10:55 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DCCS- SDG#: DSG01-22

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	38	1	2	1
10954	Perfluoromonanoic acid	375-95-1	13	1	2	1
10954	Perfluorodecanoic acid	335-76-2	12	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	4	3	5	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72638-94-8	N.D.	3	5	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	26	1	2	1
10954	Perfluorohexanoic acid	375-85-9	13	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	18	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	15	5	10	1
10954	NEtFOSSAA	2991-50-6	N.D. UV	5	8	1
	NEtFOSSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSSAA	2358-31-9	N.D. UV	4	8	1
	NMeFOSSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFOS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 15:23	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*This limit was used in the evaluation of the final result



Lancaster Laboratories
Environmental

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Analysis Report

REVISED

Sample Description: DGC-10D Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619373
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 11:00 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DGCD- SDG#: DSG01-23

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	110	1	2	1
10954	Perfluorononanoic acid	375-95-1	3	1	2	1
10954	Perfluorodecanoic acid	335-76-2	5	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	21	1	2	1
10954	Perfluorheptanoic acid	375-85-9	13	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	35	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	24	5	10	1
10954	NETFOSAA	2991-50-6	N.D. UT	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D. UT	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 15:35	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

REVISED

Sample Description: UPA-02S Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619374
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 13:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50
Reported: 11/22/2016 14:19

UPA2S SDG#: DSG01-24

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	60	1	2	1
10954	Perfluorononanoic acid	375-95-1	2	1	2	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	2	1
10954	Perfluoroundecanoic acid	2056-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.UJ	3	5	1
10954	Perfluorotridecanoic acid	72629-94-6	N.D.UJ	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.UJ	3	5	1
10954	Perfluorohexanoic acid	307-24-4	44	1	2	1
10954	Perfluorohexanoic acid	375-85-9	21	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	5	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	10	1
10954	NEtFOSAA	2991-50-6	N.D.UJ	5	8	1
	NNetFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.UJ	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 15:48	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result

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REVISED

Sample Description: UPA-02D Grab Groundwater
Delaware Sand & GravelLL Sample # WW 8619375
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 13:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 09/30/2016 18:50

Mt. Laurel NJ 08054

Reported: 11/22/2016 14:19

UPA2D SDG#: DSG01-25

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	180	1	2	1
10954	Perfluorononanoic acid	375-95-1	9	1	2	1
10954	Perfluorodecanoic acid	335-76-2	3	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	27	1	2	1
10954	Perfluoroheptanoic acid	375-85-9	18	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	34	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	21	5	10	1
10954	NETFOSAA	2991-50-6	N.D. UJ	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D. UJ	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 16:00	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: DDA-12-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619376
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 15:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 09/30/2016 18:50

Reported: 11/22/2016 14:19

DDA12 SDG#: DSG01-26

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	230	1	2	1
10954	Perfluorononanoic acid	375-95-1	13	1	2	1
10954	Perfluorodecanoic acid	335-76-2	2	3	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	5	1
10954	Perfluorotridecanoic acid	72623-84-8	N.D.	3	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	5	1
10954	Perfluorohexanoic acid	307-24-4	60	1	2	1
10954	Perfluorheptanoic acid	375-85-9	34	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	25	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	19	5	10	1
10954	NEtFOSAA	2991-53-6	N.D.	5	8	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D. NJ	4	8	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 16:12	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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Sample Description: DDA-03 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8619377
LL Group # 1715314
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 09/29/2016 16:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 09/30/2016 18:50

Mt. Laurel NJ 08054

Reported: 11/22/2016 14:19

DDA03 SDG#: DSG01-27

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	600	10	20	10
10954	Perfluorononanoic acid	375-95-1	12	1	2	1
10954	Perfluorodecanoic acid	335-76-2	7	1	2	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. UJ	2	4	1
10954	Perfluorododecanoic acid	307-55-1	N.D. UJ	3	5	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. UJ	2	4	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. UJ	3	5	1
10954	Perfluorohexanoic acid	307-24-4	61	1	2	1
10954	Perfluorooctanoic acid	375-85-9	48 J-	1	2	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	10	1
10954	Perfluorohexanesulfonate	355-46-4	73	4	10	1
10954	Perfluoro-octanesulfonate	1763-23-1	64	5	10	1
10954	NETFOSAA	2991-50-6	N.D. UJ	5	8	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	4 J	4	8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/18/2016 14:46	Jason W Knight	1
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16281008	10/25/2016 13:20	Jason W Knight	10
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16281008	10/10/2016 09:30	Robert Brown	1

*=This limit was used in the evaluation of the final result



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Analysis Report

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Sample Description: TEGW-100316 Water
Delaware Sand & Gravel

LL Sample # WW 8635689
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05
Reported: 12/12/2016 14:22

DSGT3 SDG#: DSG02-01TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	378-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutansulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.			
10954	NMeFOSAA	2385-31-9	N.D.	4	1
10954	NMeFOSAA	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.			

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.
Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	15295001	10/25/2016 01:45	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

Sample Description: FDGW-100316 Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635690
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGD3 SDG#: DSG02-02FD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc.	Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	170 $\frac{T}{T}$	1	1
10954	Perfluorononanoic acid	375-95-1	8 $\frac{T}{T}$	2	1
10954	Perfluorodecanoic acid	335-76-2	13 $\frac{T}{T} +$	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. $\frac{U}{T}$	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	375-08-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	45 $\frac{T}{T}$	1	1
10954	Perfluoroheptanoic acid	375-85-9	26 $\frac{T}{T}$	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. $\frac{U}{T}$	4	1
10954	Perfluorohexanesulfonate	355-46-4	110 $\frac{T}{T} +$	4	1
10954	Perfluoro-octanesulfonate	1763-33-1	50 $\frac{T}{T} +$	5	1
10954	NEtFOSAA	2991-50-6	N.D. $\frac{U}{T}$	5	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. $\frac{U}{T}$	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFOS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 03:17	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/31/2016 11:30	Robert Brown	2

Sample Description: UPA-03D Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635691
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 11:40 by CD

Golder Associates Incorporated

200 Century Parkway
Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 12/12/2016 14:22

DSGU3 SDG#: DSG02-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluoroctanoic acid	335-67-1	180 J	1	1
10954	Perfluorononanoic acid	375-95-1	8 JT	1	1
10954	Perfluorodecanoic acid	335-76-2	13 JT	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. UT	2	2
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	51 J	1	1
10954	Perfluorohexanoic acid	375-85-9	29 JT	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. UT	4	1
10954	Perfluorohexanesulfonate	355-46-4	110 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	55 JT	5	1
10954	NETFOSAA	2991-50-6	N.D. UT	5	1
			NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.		
10954	NMeFOSAA	2355-31-9	N.D. UT	4	2
			NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.		

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 02:50	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
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Analysis Report

Sample Description: FBGW-100316 Water
Delaware Sand & Gravel

LL Sample # WW 8635692
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 12:06 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGF3 SDG#: DSG02-04FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
	Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorohexanoic acid	375-88-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	335-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NEtFOSAA	2991-80-6	N.D.	5	1

NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.

10954 NMeFOSAA 2355-31-9 N.D. 4

NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 03:56	Marissa C Brexinger	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-26N Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635693
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 12:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 12/12/2016 14:22

DSG26 SDG#: DSG02-05BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	87 J	1	1
10954	Perfluorononanoic acid	375-95-1	4 J+	1	1
10954	Perfluorodecanoic acid	335-76-2	1 ✓ J+	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ✓J	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D. ↓	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. ↓	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. ↓	3	1
10954	Perfluorohexanoic acid	307-24-4	20 J	1	1
10954	Perfluoroheptanoic acid	375-85-9	11 J+	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ✓J	4	1
10954	Perfluorohexamersulfonate	355-46-4	17 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	11 J+	5	1
10954	NETFOSAA	2991-50-6	N.D. ✓J	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. ✓J	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/24/2016 23:17	Marissa C Draxinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
Environmental

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Analysis Report

Sample Description: MW-26NMS Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635694
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 12:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05
Reported: 12/12/2016 14:22

Mt. Laurel NJ 08054

DSG26 SDG#: DSG02-05MS

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	270	1	1
10954	Perfluorononanoic acid	375-95-1	180	1	1
10954	Perfluorodecanoic acid	335-76-2	190	1	1
10954	Perfluoroundecanoic acid	2058-94-8	190	2	1
10954	Perfluorododecanoic acid	307-55-1	210	3	1
10954	Perfluorotridecanoic acid	72629-94-8	200	2	1
10954	Perfluorotetradecanoic acid	376-06-7	210	3	1
10954	Perfluorohexanoic acid	307-24-4	210	1	1
10954	Perfluorohexanoic acid	375-85-9	160	1	1
10954	Perfluorohutanesulfonate	375-73-5	150	4	1
10954	Perfluorohexanesulfonate	355-46-4	210	4	1
10954	Perfluorooctanesulfonate	1763-23-1	190	5	1
10954	NEtFOSAA	2991-58-6	180	5	1
	NetFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	3355-31-9	230	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (IC) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/24/2016 23:50	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

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Sample Description: MW-26NMSD Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635695
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 12:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSG26 SDG#: DSG02-05MSD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	250	1	1
10954	Perfluorononanoic acid	375-95-1	170	1	1
10954	Perfluorodecanoic acid	335-76-2	170	1	1
10954	Perfluoroundecanoic acid	2058-94-8	180	2	1
10954	Perfluorododecanoic acid	307-55-1	190	3	1
10954	Perfluorotridecanoic acid	72629-94-8	180	2	1
10954	Perfluorotetradecanoic acid	376-06-7	200	3	1
10954	Perfluorohexanoic acid	307-24-4	220	1	1
10954	Perfluorohexanoic acid	375-85-9	160	1	1
10954	Perfluorobutanesulfonate	375-73-5	140	4	1
10954	Perfluorohexanesulfonate	355-46-4	200	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	180	5	1
10954	NETFOSAA	2991-50-6	170	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	220	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 00:56	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

Sample Description: DGC-11D Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635696
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 14:40 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/07/2016 18:05

Suite C

Reported: 12/12/2016 14:22

Mt. Laurel NJ 08054

GC11D SDG#: DSG02-06

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	43 J +	1	1
10954	Perfluoromonanoic acid	375-95-1	13 J	1	1
10954	Perfluorodecanoic acid	335-76-2	3 J	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. UJ	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. 1	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. 1	3	1
10954	Perfluorohexanoic acid	307-24-4	22 J	1	1
10954	Perfluorheptanoic acid	375-85-9	13 J	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. UJ	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D. UJ	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	7 X J +	5	1
10954	NETPOSAA	2991-50-6	N.D. UJ	5	1
	NETPOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFCSAA	2355-31-9	N.D. UJ	4	1
	NMeFCSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 04:29	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

Sample Description: DGC-11S Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635697
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/03/2016 14:55 by CD

Golder Associates Incorporated

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Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05
Reported: 12/12/2016 14:22

GC11S SDG#: DSG02-07

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D. ^{UJ}	1	1
10954	Perfluorononanoic acid	375-95-1	N.D. ^{UJ}	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D. ^{UJ}	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ^{UJ}	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D. ^{UJ}	3	1
10954	Perfluorotridecanoic acid	72628-94-8	N.D. ^{UJ}	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. ^{UJ}	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D. ^{UJ}	1	1
10954	Perfluoroheptanoic acid	375-88-9	N.D. ^{UJ}	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^{UJ}	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D. ^{UJ}	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D. ^{UJ}	5	1
10954	NELFOSAA	2991-50-6	N.D. ^{UJ}	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. ^{UJ}	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.				
	Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (1C) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 05:01	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: TBCGW-100416 Water
Delaware Sand & Gravel

LL Sample # WW 8635698
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/04/2016

Golder Associates Incorporated

Submitted: 10/07/2016 18:05

200 Century Parkway

Reported: 12/12/2016 14:22

Suite C

Mt. Laurel NJ 08054

DSGT4 SDG#: DSG02-08TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
	Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-98-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorohexadecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-83-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFCSSA	2391-50-6	N.D.	5	1
	NETFCSSA	NETFCSSA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.			
10954	NMeFCSSA	2355-31-9	N.D.	4	1
	NMeFCSSA	NMeFCSSA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.			

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 05:18	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: FBGW-100416 Water
Delaware Sand & Gravel

LL Sample # WW 8635699
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/04/2016 12:33 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGF4 SDG#: DSG02-09FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorooctanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA		NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.		
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA		NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.		

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/26/2016 06:23	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: BW-2 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635700
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/04/2016 12:50 by CD

Golder Associates Incorporated

Submitted: 10/07/2016 18:05

200 Century Parkway
Suite C

Reported: 12/12/2016 14:22

Mt. Laurel NJ 08054

DSGB2 SDG#: DSG02-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	83 ^T	1	1
10954	Perfluorononanoic acid	375-98-1	9 ^T	1	1
10954	Perfluorodecanoic acid	335-76-2	2 ^T	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ^{U/T}	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D. ^U	3	1
10954	Perfluorotridecanoic acid	72628-94-8	N.D. ^U	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. ^U	3	1
10954	Perfluorohexanoic acid	307-24-4	20 ^T	1	1
10954	Perfluoroheptanoic acid	375-88-9	13 ^T	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^{U/T}	4	1
10954	Perfluorohexanesulfonate	355-46-4	11 ^T	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	17 ^T	5	1
10954	NETFOSAA	2991-58-6	N.D. ^{U/T}	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. ^{U/T}	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 06:40	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

Sample Description: BW-1 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635701
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/04/2016 13:35 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/07/2016 18:05

Suite C

Reported: 12/12/2016 14:22

Mt. Laurel NJ 08054

DSGB1 SDG#: DSG02-11

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	130 J^+	1	1
10954	Perfluorononanoic acid	375-95-1	10 J^+	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D. J^+	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	25 J^+	1	1
10954	Perfluoroheptanoic acid	375-85-9	16 J^+	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. J^+	4	1
10954	Perfluorohexanesulfonate	355-46-4	16 J^+	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	18 J^+	5	1
10954	NETFOSAA	2391-50-6	N.D. J^+	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. J^+	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				
	The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.				
	Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/28/2016 06:56	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

Sample Description: TBCW-100516 Water
Delaware Sand & Gravel

LL Sample # WW 8635702
LL Group # 1710978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016

Golder Associates Incorporated

Submitted: 10/07/2016 18:05

200 Century Parkway
Suite C

Reported: 12/12/2016 14:22

Mt. Laurel NJ 08054

DSGTS SDG#: DSG02-12TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NMeFOSAA	2991-50-6	N.D.	5	1
	NEtFOSAA				
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 07:13	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	2

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Sample Description: FBGW-100516 Water
Delaware Sand & Gravel

LL Sample # WW 8635703
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 10:00 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGFS SDG#: DSG02-13FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NEtFOSAA	2991-50-6	N.D.	5	1
10954	NMeFOSAA	2355-31-9	N.D.	4	1

NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.

NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.

The stated QC limits are advisory only until sufficient data points

can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were

switched during the extraction process. The samples were re-extracted outside

the required hold time. After consulting with the client the re-extracted data

is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 08:18	Marissa G Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



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Analysis Report

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Sample Description: DDA-10-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635704
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 10:40 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGDD SDG#: DSG02-14

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	180 ^T	1	1
10954	Perfluoromonanoic acid	375-95-1	7 ^T	1	1
10954	Perfluorodecanoic acid	335-76-2	2 ^T	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ^{U/T}	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72628-34-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	43 ^{U/T}	1	1
10954	Perfluorohexanoic acid	375-85-9	21 ^T	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^{U/T}	4	1
10954	Perfluorohexanesulfonate	355-46-4	53 ^T	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	16 ^T	5	1
10954	NETFOSAA	2991-56-6	N.D. ^{U/T}	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D. ^{U/T}	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 08:35	Mariissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: FDGW-100516 Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635705
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 12/12/2016 14:22

DSGDS SDG#: DSG02-15FD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	130 ^J	1	1
10954	Perfluorononanoic acid	375-95-1	9 ^J	1	1
10954	Perfluorodecanoic acid	335-76-2	2 ^J	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ^{UJ}	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D. ^J	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. ^J	3	1
10954	Perfluorotetradecanoic acid	375-06-7	N.D. ^J	3	1
10954	Perfluorohexanoic acid	307-24-4	30 ^J	1	1
10954	Perfluorohexanoic acid	375-85-9	19 ^J	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^{UJ}	4	1
10954	Perfluorohexanesulfonate	355-46-4	10 ^J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	120 ^J	5	1
10954	NETFOSAA	2991-50-6	N.D. ^{UJ}	5	1
10954	NETFOSAA	2355-31-9	N.D. ^{UJ}	4	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
	NMeFOSAA				
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.
Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 08:51	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1



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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-29 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635706
LL Group # 1718978
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 12:00 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 12/12/2016 14:22

DSG29 SDG#: DSG02-16

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc.	Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	120 ^J	1	1
10954	Perfluorononanoic acid	375-95-1	9 ^J	1	1
10954	Perfluorodecanoic acid	335-76-2	2 ^J	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D. ^{VJ}	2	1
10954	Perfluorododecanoic acid	307-65-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	176-06-7	N.D.	3	1
10954	Perfluoroheptanoic acid	307-24-4	31 ^J	1	1
10954	Perfluoroheptanoic acid	375-85-9	19 ^J	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D. ^{VJ}	4	1
10954	Perfluorohexanesulfonate	355-46-4	10 ^J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	130 ^J	5	1
10954	NMeFOSAA	2991-50-6	N.D. ^{VJ}	5	1
NMeFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D. ^{VJ}	4	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

The stated QC limits are advisory only until sufficient data points can be obtained to calculate statistical limits.

Due to a sample handling error, the samples on this extraction batch were switched during the extraction process. The samples were re-extracted outside the required hold time. After consulting with the client the re-extracted data is being reported.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295001	10/25/2016 09:07	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	2	16295001	10/21/2016 11:30	Robert Brown	1

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Sample Description: MW-31 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635707
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 12:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSG31 SDG#: DSG03-01BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	190 J-	1	1
10954	Perfluorononanoic acid	375-95-1	6	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	2
10954	Perfluorododecanoic acid	307-55-1	N.D. UJ	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. UJ	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. UJ	3	1
10954	Perfluorohexanoic acid	307-24-4	40 J-	1	1
10954	Perfluorheptanoic acid	375-85-9	28	1	1
10954	Perfluorobutanesulfonate	375-73-5	4 J	4	1
10954	Perfluorohexanesulfonate	355-46-4	10	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	100	5	1
10954	NETFOSAA	2991-50-6	25	5	1
10954	NETFOSAA				
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 01:25	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-31MS Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635708
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 12:25 by CD

Golder Associates Incorporated

200 Century Parkway
Suite C

Submitted: 10/07/2016 18:05
Reported: 10/26/2016 15:09

Mt. Laurel NJ 08054

DSG31 SDG#: DSG03-01MS

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	360	1	1
10954	Perfluorochonanoic acid	275-95-1	180	1	1
10954	Perfluorodecanoic acid	335-76-2	150	1	1
10954	Perfluoroundecanoic acid	2058-94-8	180	2	1
10954	Perfluorododecanoic acid	307-55-1	170	3	1
10954	Perfluorotridecanoic acid	72629-94-8	240	2	1
10954	Perfluorotetradecanoic acid	376-06-7	240	3	1
10954	Perfluorohexanoic acid	307-24-4	220	1	1
10954	Perfluorohexanoic acid	375-85-9	190	1	1
10954	Perfluorobutanesulfonate	375-73-5	170	4	1
10954	Perfluorohexanesulfonate	355-46-4	180	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	270	5	1
10954	NMeFOSAA	2991-50-6	200	5	1
	NetFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	220	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	15288004	10/21/2016 01:41	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	15288004	10/17/2016 12:10	Devon M Whooley	1

Analysis Report

Sample Description: MW-31MSD Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635709

LL Group # 1718979

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 12:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSG31 SDG#: DSG03-01MSD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc.	Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l	
10954	Perfluoroctanoic acid	335-67-1	350	1	1
10954	Perfluorononanoic acid	375-95-1	170	1	1
10954	Perfluorodecanoic acid	335-76-2	150	1	1
10954	Perfluoroundecanoic acid	2058-94-8	190	2	1
10954	Perfluorododecanoic acid	307-55-1	180	3	1
10954	Perfluorotridecanoic acid	72629-94-8	220	2	1
10954	Perfluorotetradecanoic acid	376-06-7	200	3	1
10954	Perfluorohexanoic acid	307-24-4	220	1	1
10954	Perfluoroheptanoic acid	375-85-9	180	1	1
10954	Perfluorobutanesulfonate	375-73-5	190	4	1
10954	Perfluorohexanesulfonate	355-46-4	200	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	280	5	1
10954	NETFOSAA	2991-50-6	200	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluoroctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	220	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluoroctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 01:57	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: RT-1UP Grab Groundwater
Delaware Sand & Gravel

LL Sample # WM 8635710
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 15:15 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSG1U SDG#: DSG03-02

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics EPA 537 Rev. 1.1 modified					
10954	Perfluorooctanoic acid	335-67-1	2	1	1
10954	Perfluoromonanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	3	1	1
10954	Perfluoropentanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanatesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NetFOSAA	2991-50-6	N.D.	5	1
NetFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	FPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 03:03	Jason W Knight	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

Sample Description: MW-28 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635711

LL Group # 1718979

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/05/2016 15:40 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05
Reported: 10/26/2016 15:09

DSG28 SDG#: DSG03-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	54	1	1
10954	Perfluorononanoic acid	375-95-1	3 J+	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72529-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	40	1	1
10954	Perfluoroheptanoic acid	375-85-9	23	1	1
10954	Perfluorobutanesulfonate	375-73-5	6 J	4	1
10954	Perfluorohexanesulfonate	355-46-4	8 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	9 J	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA		NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.		
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA		NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.		

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 03:19	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



Lancaster Laboratories
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Analysis Report

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Sample Description: TBGW-100616 Water
Delaware Sand & Gravel

LL Sample # WW 8635712
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSGT6 SDG#: DSG03-04TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluoromonanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-84-8	N.D.	3	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 03:36	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

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Sample Description: FBGW-100616 Water
Delaware Sand & Gravel

LL Sample # WW 8635713
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 09:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSGF6 SDG#: DSG03-05FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-65-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2395-31-9	N.D.	4	2
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 03:52	Jason W Knight	1
14081	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: DGC-8D Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635714
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 11:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSG8D SDG#: DSG03-06

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics EPA 537 Rev. 1.1 modified					
10954	Perfluorooctanoic acid	335-67-1	49	1	1
10954	Perfluorochronanonic acid	375-95-1	3 3 †	1	1
10954	Perfluorodecanoic acid	335-76-2	1 2 3 †	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	3	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	13	1	1
10954	Perfluoroheptanoic acid	375-85-9	8	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	17	4	1
10954	Perfluoro-octanesulfonate	1763-33-1	13	5	1
10954	NETFOSAA	2391-50-6	N.D.	5	1
NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

AMZ
3/23/17

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 04:09	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: DGC-8S Grab Groundwater
Delaware Sand & GravelLL Sample # WW 8635715
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 11:40 by CD

Golder Associates Incorporated

200 Century Parkway
Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSG8S SDG#: DSG03-07

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc.	Organics	EPA 537 Rev. 1.1	ng/l	ng/l	
	modified				
10954	Perfluorooctanoic acid	335-67-1	34	1	1
10954	Perfluorononanoic acid	375-95-1	5	1	1
10954	Perfluorodecanoic acid	335-76-2	2	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	31 T-	1	1
10954	Perfluorheptanoic acid	375-85-9	8	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (18) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 04:25	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MHW-1D Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635716
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 15:15 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSGID SDG#: DSG03-08

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	280	1	1
10954	Perfluorononanoic acid	375-95-1	13 34	1	1
10954	Perfluorodecanoic acid	335-76-2	2	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluoroicosidecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	40	1	1
10954	Perfluoroheptanoic acid	375-85-9	31	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	155-46-4	14	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	16	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 04:41	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: DDA-15-US Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635717
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 15:35 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSG15 SDG#: DSG03-09

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	200	1	1
10954	Perfluorononanoic acid	375-95-1	5	1	1
10954	Perfluorodecanoic acid	335-76-2	1	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-35-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	21	1	1
10954	Perfluorheptanoic acid	375-85-9	17	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	26	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	22	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA				
10954	NMeFOSAA	2365-31-9	N.D.	4	1
10954	NMeFOSAA				

NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 04:58	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: UPA-01 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635718
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/06/2016 16:00 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05

Reported: 10/26/2016 15:09

DSGP1 SDG#: DSG03-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics EPA 537 Rev. 1.1 modified					
10954	Perfluorooctanoic acid	335-67-1	120	1	1
10954	Perfluoromonanoic acid	375-95-1	6	1	1
10954	Perfluorodecanoic acid	335-76-2	5	1	1
10954	Perfluoroundecanoic acid	3058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	38.3	1	1
10954	Perfluorohexanoic acid	375-85-9	23	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	335-46-4	52	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	29	5	1
10954	NEtFOSAA	2991-50-5	N.D.	5	1
NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 05:14	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whoooley	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: TBGW-100716 Water
Delaware Sand & Gravel

LL Sample # WW 8635719
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/07/2016 18:05
Reported: 10/26/2016 15:09

DSGT7 SDG#: DSG03-11TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluoroctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.			4	
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 05:31	Jason W Knight	1
14091	FFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: FBCGW-100716 Water
Delaware Sand & Gravel

LL Sample # WW 8635720
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016 11:41 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSGF7 SDG#: DSG03-12FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	3	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-21-1	N.D.	5	1
10954	NEtFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	3355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFOS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2015 06:36	Jason W Knight	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whaley	1



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: MW-18 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635721

LL Group # 1718979

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016 11:55 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/07/2016 18:05

Suite C

DSG18 SDG#: DSG03-13

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluoroctanoic acid	335-67-1	150 J-	1	1
10954	Perfluororononanoic acid	375-95-1	6	1	1
10954	Perfluorodecanoic acid	335-76-2	2 J	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	28 J-	1	1
10954	Perfluorohexanoic acid	375-85-9	20	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	25	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	47	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluoroctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluoroctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/31/2016 06:52	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whealey	1



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Analysis Report

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Sample Description: MW-34 Grab Groundwater
Delaware Sand & Gravel

LL Sample # WW 8635722
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016 12:45 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSG34 SDG#: DSG03-14

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	66	3	1
10954	Perfluorooctanoic acid	375-88-1	5	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	3	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	18	1	1
10954	Perfluorohexanoic acid	375-88-9	10	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	14	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	14	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA			NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA			NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCo (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 07:09	Jason W Knight	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

Sample Description: P-5L (UPA) Grab Groundwater
Delaware Sand & Gravel

LL Sample # WM 8635723
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016 14:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSG5L SDG#: DSG03-15

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	35	1	1
10954	Perfluorononanoic acid	378-95-1	1 <i>X J+</i>	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	9	1	1
10954	Perfluorheptanoic acid	378-85-9	5 <i>J+</i>	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	7 <i>J</i>	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	5 <i>J</i>	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NBtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 07:35	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

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Sample Description: P-SU (UPA) Grab Groundwater
Delaware Sand & GravelLL Sample # WW 8635724
LL Group # 1718979
Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/07/2016 15:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Submitted: 10/07/2016 18:05

Mt. Laurel NJ 08054

Reported: 10/26/2016 15:09

DSG5U SDG#: DSG03-16

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	76	1	1
10954	Perfluorononanoic acid	375-95-1	8	1	1
10954	Perfluorodecanoic acid	335-76-2	4	1	1
10954	Perfluoroundecanoic acid	2058-94-8	5	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	46	1	1
10954	Perfluorohexanoic acid	375-85-9	23	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	358-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/21/2016 07:42	Jason W Knight	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/17/2016 12:10	Devon M Whooley	1

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Sample Description: TBGW_101016 Water

LL Sample # WW 8646237

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/10/2016

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

TBGW- SDG#: DSG05-01TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	3	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NEtFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 05:49	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 14:35	Devon M Whooley	1

Analysis Report

Sample Description: FDGW_101016 Grab Groundwater

LL Sample # WW 8646238

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/10/2016 by CD

Account # 05667

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

FDGW- SDG#: DSG05-02FD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	160	1	1
10954	Perfluoromonanoic acid	375-95-1	5 J+	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	3	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72623-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-86-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	44	1	1
10954	Perfluoroheptanoic acid	375-85-9	29	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-45-4	7 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	9 J	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
			NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.		
10954	NMeFOSAA	2385-31-9	N.D.	4	1
			NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.		

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/26/2016 06:05	Marissa C Drexinger	1
14091	PFRA Water Prep	EPA 537 Rev. 1.1 modified	3	16293009	10/20/2016 14:35	Devon M Whealey	1



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Analysis Report

Sample Description: DGC-5 Grab Groundwater

LL Sample # WW 8646239

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/10/2016 12:05 by CD

Golder Associates Incorporated

Submitted: 10/14/2016 18:35

200 Century Parkway

Reported: 11/01/2016 10:21

Suite C

Mt. Laurel NJ 08054

DGC5- SDG#: DSG05-03

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	190	1	1
10954	Perfluorononanoic acid	375-95-1	6 J+	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	55	1	1
10954	Perfluoroheptanoic acid	375-85-9	31 J+	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	7 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	12	5	1
10954	NEtFOSAA	2391-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 06:22	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 14:35	Devon M Whooley	1

Sample Description: DDA-07-US Grab Groundwater

LL Sample # WW 8646240

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/10/2016 12:50 by CD

Account # 05667

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

DDA07 SDG#: DSG05-04BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	150	1	1
10954	Perfluorononanoic acid	375-99-1	9	1	1
10954	Perfluorodecanoic acid	335-76-2	1 J	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	25	1	1
10954	Perfluorheptanoic acid	375-85-9	16	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorhexanesulfonate	355-46-4	21	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	19	5	1
10954	NETPOSAA	2991-80-6	N.D.	5	1
	NETPOSAA				
	NETPOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA				
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 03:38	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	15293009	10/20/2016 14:35	Devon M Whooley	1



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Environmental

Analysis Report

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Sample Description: DDA-07-US MS Grab Groundwater

LL Sample # WW 8646241

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/10/2016 12:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

DDA07 SDG#: DSG05-04MS

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	270	1	1
10954	Perfluorononanoic acid	375-95-1	150	1	1
10954	Perfluorodecanoic acid	335-76-2	160	1	1
10954	Perfluoroundecanoic acid	2058-94-8	150	2	1
10954	Perfluorododecanoic acid	307-55-1	180	3	1
10954	Perfluorotridecanoic acid	72629-94-8	160	2	1
10954	Perfluorotetradecanoic acid	376-06-7	170	3	1
10954	Perfluorohexanoic acid	307-24-4	170	1	1
10954	Perfluorheptanoic acid	375-85-9	150	1	1
10954	Perfluorobutanesulfonate	375-73-5	160	4	1
10954	Perfluorohexanesulfonate	355-46-4	180	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	160	5	1
10954	NETFOSAA	2991-50-5	150	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	190	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 03:54	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1

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Sample Description: DDA-07-US MSD Grab Groundwater

LL Sample # WW 8646242

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/10/2016 12:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

DDA07 SDG#: DSG05-04MSD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	340	1	1
10954	Perfluorononanoic acid	375-95-1	180	1	1
10954	Perfluorodecanoic acid	335-76-2	170	1	1
10954	Perfluoroundecanoic acid	2058-94-8	190	2	1
10954	Perfluorododecanoic acid	307-55-1	200	3	1
10954	Perfluorotridecanoic acid	72629-94-8	190	2	1
10954	Perfluorotetradecanoic acid	376-06-7	220	3	1
10954	Perfluorohexanoic acid	307-24-4	200	1	1
10954	Perfluoroheptanoic acid	375-85-9	180	1	1
10954	Perfluorobutanesulfonate	375-73-5	180	4	1
10954	Perfluorohexanesulfonate	355-46-4	210	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	200	5	1
10954	NETFOSAA	2991-56-6	190	5	1
10954	NETFOSAA	2355-31-9	230	4	1
NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 05:00	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 14:35	Devon M Whooley	1

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Sample Description: FBGW_101016 Grab Water

LL Sample # WW 8646243

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/10/2016 15:20 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/14/2016 18:35

Suite C

Reported: 11/01/2016 10:21

Mt. Laurel NJ 08054

FB-GW SDG#: DSG05-05FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72623-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 06:38	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1

Sample Description: DGC-7S Grab Groundwater

LL Sample # WW 8646244

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Account # 05667

Collected: 10/10/2016 16:05 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/14/2016 18:35

Suite C

Reported: 11/01/2016 10:21

Mt. Laurel NJ 08054

DGC7S SDG#: DSG05-06

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	130	1	1
10954	Perfluorononanoic acid	375-95-1	10	1	1
10954	Perfluorodecanoic acid	335-76-3	1	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	23	1	1
10954	Perfluoroheptanoic acid	375-85-9	16	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	9	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	15	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA				
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA				
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				
	NETFOSAA				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 06:55	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1

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Sample Description: TBGW_101316 Water

LL Sample # WW 8646245

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/13/2016

Account # 05667

Golder Associates Incorporated

Submitted: 10/14/2016 18:35

200 Century Parkway

Reported: 11/01/2016 10:21

Suite C

Mt. Laurel NJ 08054

TB-GW SDG#: DSG05-07TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoroheptanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 12:55	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1

Sample Description: FBGW_101316 Grab Water

LL Sample # WW 8646246

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Account # 05667

Collected: 10/13/2016 10:55 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

FB--G SDG#: DSG05-08FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluoromonanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridacanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluoropentanoic acid	375-85-9	N.D.	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA				
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA				
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/26/2016 13:12	Marissa C Drexinger	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	15295004	10/24/2016 10:00	Robert Brown	1

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Sample Description: FDGW_101316 Grab Groundwater

LL Sample # WW 8646247

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/13/2016 by CD

Account # 05667

Golder Associates Incorporated

Submitted: 10/14/2016 18:35

200 Century Parkway

Reported: 11/01/2016 10:21

Suite C

Mt. Laurel NJ 08054

FD-GW SDG#: DSG05-09FD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	86	1	1
10954	Perfluorononanoic acid	375-95-1	10	1	1
10954	Perfluorodecanoic acid	335-76-2	2	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72529-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	29	1	1
10954	Perfluoroheptanoic acid	375-85-9	16	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	10 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	11	5	1
10954	NETFOSAA	2391-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	BFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 13:28	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1



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Analysis Report

Sample Description: AWC-E1 (132) Grab Groundwater

LL Sample # WW 8646248

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/13/2016 10:50 by CD

Account # 05667

Golder Associates Incorporated

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Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWC12 SDG#: DSG05-10

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	84	1	1
10954	Perfluorononanoic acid	375-95-1	10	1	1
10954	Perfluorodecanoic acid	335-76-2	3	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	29	1	1
10954	Perfluoroheptanoic acid	375-85-9	16	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	9	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	10	5	1
10954	NETFCSSA	2991-50-6	N.D.	5	1
	NETFCSSA				
	NMeFCSSAA	2355-31-9	N.D.	4	1
	NMeFCSSAA				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 13:44	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 16:00	Robert Brown	1



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Analysis Report

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Sample Description: AWC-E2 (140) Grab Groundwater

LL Sample # WW 8646249

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Account # 05667

Collected: 10/13/2016 11:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWC14 SDG#: DSG05-11BKG

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	110	1	1
10954	Perfluorononanoic acid	375-95-1	6	1	1
10954	Perfluorodecanoic acid	335-76-2	3	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	30	1	1
10954	Perfluoroheptanoic acid	375-85-9	12	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	30	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	14	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
10954	NMeFOSAA	2355-31-9	N.D.	4	1
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 10:44	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1



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Analysis Report

Sample Description: AWC-E2 (140) MS Grab Groundwater

LL Sample # WW 8646250

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/13/2016 11:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWCE2 SDG#: DSG05-11MS

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	290	1	1
10954	Perfluorononanoic acid	375-95-1	170	1	1
10954	Perfluorodecanoic acid	335-75-2	170	1	1
10954	Perfluoroundecanoic acid	2058-94-8	160	2	1
10954	Perfluorododecanoic acid	307-55-1	190	3	1
10954	Perfluorotridecanoic acid	72629-94-6	170	2	1
10954	Perfluorotetradecanoic acid	376-06-7	170	3	1
10954	Perfluorohexanoic acid	307-24-4	200	1	1
10954	Perfluoropeptanoic acid	375-85-9	160	1	1
10954	Perfluorobutanesulfonate	375-73-5	160	4	1
10954	Perfluorhexanesulfonate	355-46-4	210	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	160	5	1
10954	NFOSAA	2991-80-6	160	5	1
	NETFOSAA				
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	220	4	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	15295004	10/28/2016 11:01	Marissa C Drexinger	1
14031	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1



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Analysis Report

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Sample Description: AWC-E2 (140) MSD Grab Groundwater

LL Sample # WW 8646251

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/13/2016 11:25 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWC4- SDG#: DSG05-11MSD

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluoroctanoic acid	335-67-1	280	1	1
10954	Perfluorononanoic acid	375-95-1	160	1	1
10954	Perfluorodecanoic acid	335-76-2	180	1	1
10954	Perfluoroundecanoic acid	2058-94-8	190	2	1
10954	Perfluorododecanoic acid	307-55-1	190	3	1
10954	Perfluorotridecanoic acid	72629-94-8	160	2	1
10954	Perfluorotetradecanoic acid	376-06-7	160	3	1
10954	Perfluorohexanoic acid	307-24-4	220	1	1
10954	Perfluoroheptanoic acid	375-85-9	160	1	1
10954	Perfluorobutanesulfonate	375-73-5	150	4	1
10954	Perfluorohexanesulfonate	355-46-4	210	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	180	5	1
10954	NETFOSAA	2991-50-6	170	5	1
	NETFOSAA is the acronym for N-ethyl perfluoroctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	230	4	1
	NMeFOSAA is the acronym for N-methyl perfluoroctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCS (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 12:06	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1



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Analysis Report

Sample Description: AWC-E1 (156) Grab Groundwater

LL Sample # WW 8646252

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/13/2016 11:50 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWCE1 SDG#: DSG05-12

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	76	1	1
10954	Perfluorononanoic acid	375-95-1	12 J^+	1	1
10954	Perfluorodecanoic acid	335-76-2	4	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	30	1	1
10954	Perfluorheptanoic acid	375-65-9	15 J^+	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	8 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	11	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA	2355-31-9	N.D.	4	1
NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 14:01	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1

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Sample Description: AWC-K1 Grab Groundwater

LL Sample # WW 8646253

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Account # 05667

Collected: 10/13/2016 13:00 by CD

Golder Associates Incorporated

200 Century Parkway

Submitted: 10/14/2016 18:35

Suite C

Reported: 11/01/2016 10:21

Mt. Laurel NJ 08054

AWCK1 SDG#: DSG05-13

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	23	1	1
10954	Perfluorononanoic acid	375-95-1	2 ✓ J+	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	7	1	1
10954	Perfluoroheptanoic acid	375-85-9	4 J+	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	6 J	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	6 J	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	3355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16288004	10/28/2016 14:34	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16288004	10/24/2016 10:00	Robert Brown	1



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Analysis Report

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Sample Description: AWC-E2 (165) Grab Groundwater

LL Sample # WW 8546254

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/13/2016 13:05 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

AWC2 - SDG#: DSG05-14

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	130	1	1
10954	Perfluorononanoic acid	375-95-1	5	1	1
10954	Perfluorodecanoic acid	335-76-2	3	1	1
10954	Perfluoroundecanoic acid	2058-94-6	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D. NT	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D. NT	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D. NT	3	1
10954	Perfluorohexanoic acid	307-24-4	33	1	1
10954	Perfluoroheptanoic acid	375-85-9	15	1	1
10954	Perfluorobutanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	26	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	15	5	1
10954	NETPOSAA	2991-50-6	N.D.	5	1
10954	NETPOSAA	2355-31-9	N.D.	4	1
			NETPOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.		
			NMePOSAA		
			is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.		

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16295004	10/28/2016 14:50	Marissa C Draxinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16295004	10/24/2016 10:00	Robert Brown	1

Sample Description: TBGW_101416 Water

LL Sample # WW 8646255

LL Group # 1721593

Account # 05667

Project Name: DE Sand and Gravel Superfund Site

Collected: 10/14/2016

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

T--GW SDG#: DSG05-15TB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluorononanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorohexanoic acid	375-85-9	N.D.	1	1
10954	Perfluorohexanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA				
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 08:00	Mariissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1



Lancaster Laboratories
Environmental

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Analysis Report

Sample Description: FBCW_101416 Grab Water

LL Sample # WW 8646256

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/14/2016 10:45 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

F--GW SDG#: DSG05-16FB

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified	ng/l	ng/l		
10954	Perfluorooctanoic acid	335-67-1	N.D.	1	1
10954	Perfluoromonanoic acid	375-95-1	N.D.	1	1
10954	Perfluorodecanoic acid	335-76-2	N.D.	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	N.D.	1	1
10954	Perfluorooctanoic acid	375-85-9	N.D.	1	1
10954	Perfluorohexanesulfonate	375-73-5	N.D.	4	1
10954	Perfluorohexanesulfonate	355-46-4	N.D.	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	N.D.	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
	NETFOSAA				
	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
	NMeFOSAA				
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PFCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 08:17	Marissa C Drexinger	1
14091	PFAS Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1

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Sample Description: P-4 (UPA) Grab Groundwater

LL Sample # WW 8646257

Project Name: DE Sand and Gravel Superfund Site

LL Group # 1721593

Collected: 10/14/2016 11:10 by CD

Golder Associates Incorporated

200 Century Parkway

Suite C

Mt. Laurel NJ 08054

Submitted: 10/14/2016 18:35

Reported: 11/01/2016 10:21

P-4UP SDG#: DSG05-17

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit	Dilution Factor
Misc. Organics	EPA 537 Rev. 1.1 modified		ng/l	ng/l	
10954	Perfluorooctanoic acid	335-67-1	170	1	1
10954	Perfluorononanoic acid	375-95-1	68	1	1
10954	Perfluorodecanoic acid	335-76-2	1	1	1
10954	Perfluoroundecanoic acid	2058-94-8	N.D.	2	1
10954	Perfluorododecanoic acid	307-55-1	N.D.	3	1
10954	Perfluorotridecanoic acid	72629-94-8	N.D.	2	1
10954	Perfluorotetradecanoic acid	376-06-7	N.D.	3	1
10954	Perfluorohexanoic acid	307-24-4	86	1	1
10954	Perfluoroheptanoic acid	375-85-9	33	1	1
10954	Perfluorobutanesulfonate	375-73-5	29	4	1
10954	Perfluorohexanesulfonate	355-46-4	190	4	1
10954	Perfluoro-octanesulfonate	1763-23-1	28	5	1
10954	NETFOSAA	2991-50-6	N.D.	5	1
10954	NETFOSAA				
10954	NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.				
10954	NMeFOSAA	2355-31-9	N.D.	4	1
10954	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.				

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10954	PPCs (10) EPA 537	EPA 537 Rev. 1.1 modified	1	16293009	10/28/2016 08:33	Marissa C Drexinger	1
14091	PFAA Water Prep	EPA 537 Rev. 1.1 modified	1	16293009	10/20/2016 14:35	Devon M Whooley	1